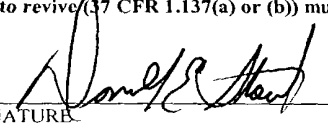


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FORM PTO-1390) (REV. 9-2001)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER 367.41543X00 filed April 5, 2002	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371				U.S. APPLICATION NO. (if known, see 37 CFR 1.5)	
				10/089988	
INTERNATIONAL APPLICATION NO PCT/EP00/09331		INTERNATIONAL FILING DATE September 25, 2000		PRIORITY DATE CLAIMED October 8, 1999	
TITLE OF INVENTION COMMUNICATION DEVICE					
APPLICANT(S) FOR DO/EO/US SHARP, JONATHAN					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information					
<p>1. <input checked="" type="checkbox"/> This is a <b>FIRST</b> submission of items concerning a filing under 35 U.S.C. 371.</p> <p>2. <input type="checkbox"/> This is a <b>SECOND</b> or <b>SUBSEQUENT</b> submission of items concerning a filing under 35 U.S.C. 371.</p> <p>3. <input type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.</p> <p>4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31).</p> <p>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))</p> <p>a. <input type="checkbox"/> is transmitted hereto (required only if not communicated by the International Bureau).</p> <p>b. <input checked="" type="checkbox"/> has been communicated by the International Bureau.</p> <p>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office(RO/US)</p> <p>6. <input checked="" type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).</p> <p>a. <input checked="" type="checkbox"/> is attached hereto.</p> <p>b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4).</p> <p>7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))</p> <p>a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau).</p> <p>b. <input type="checkbox"/> have been communicated by the International Bureau.</p> <p>c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</p> <p>d. <input type="checkbox"/> have not been made and will not be made.</p> <p>8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</p> <p>9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</p> <p>10. <input type="checkbox"/> An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</p> <p><b>Items 11 to 20 below concern document(s) or information included:</b></p> <p>11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</p> <p>12. <input type="checkbox"/> An assignment document for recording A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</p> <p>13. <input checked="" type="checkbox"/> A <b>FIRST</b> preliminary amendment.</p> <p>14. <input type="checkbox"/> A <b>SECOND</b> or <b>SUBSEQUENT</b> preliminary amendment.</p> <p>15. <input checked="" type="checkbox"/> A substitute specification.</p> <p>16. <input checked="" type="checkbox"/> A change of power of attorney and/or address letter.</p> <p>17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.</p> <p>18. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4).</p> <p>19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).</p> <p>20. <input checked="" type="checkbox"/> Other items or information: Figs. 1a-1b,2a-2b,3-16,17a-17b,18a-18c, Credit Card Payment Form, International Preliminary Examination Report, International Publication Number WO 01/28191</p>					

3675 Rec'd PTO 05 APR 2002

U.S. APPLICATION NO. <b>10/089988</b>		INTERNATIONAL APPLICATION NO. <b>PCT/EP00/09331</b>		ATTORNEY'S DOCKET NUMBER <b>367.41543X00</b>	
21. The following fees are submitted <b>BASIC NATIONAL FEE (37 CFR 1.492(a) (1) - (5)):</b> <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ... .. \$1040.00  <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ... .. \$890.00  <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ... .. \$740.00  <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4). ... .. \$710.00  <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) ... .. \$100.00  <b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>				<b>CALCULATIONS PTO USE ONLY</b>	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	\$	
Total Claims	19 - 20 =	0	x \$18.00	\$	
Independent Claims	1 - 3 =	0	x \$84.00	\$	
MULTIPLE DEPENDENT CLAIMS(S) (if applicable) 0			+ \$280.00	\$	
<b>TOTAL OF ABOVE CALCULATIONS =</b>				<b>\$890.00</b>	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$	
<b>SUBTOTAL =</b>				<b>\$890.00</b>	
Processing fee of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
<b>TOTAL NATIONAL FEE =</b>				<b>\$890.00</b>	
Fee for recording the enclosed assignment (37 CFR 1.21(h)) The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				\$	
<b>TOTAL FEES ENCLOSED =</b>				<b>\$890.00</b>	
				Amount to be refunded:	\$
				charged:	\$
a. <input type="checkbox"/> A check in the amount of \$_____ to cover the fees is enclosed b. <input type="checkbox"/> Please charge my Deposit Account No. <b>01-2135</b> in the amount of \$_____ to cover the above fees. A duplicate copy of this sheet is enclosed c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <b>01-2135</b> . A duplicate copy of this sheet is enclosed. d. <input checked="" type="checkbox"/> Fees are to be charged to a credit card <b>WARNING:</b> Information on this form may become public. <b>Credit card information should not be included on this form.</b> Provide credit card information and authorization on PTO-2038.					
<b>NOTE:</b> Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.					
SEND ALL CORRESPONDENCE TO  <b>Antonelli, Terry, Stout &amp; Kraus, LLP</b> 1300 North Seventeenth Street Suite 1800 Arlington, VA 22209 USA					
				 SIGNATURE Donald E. Stout NAME 26,422 REGISTRATION NO.	

DOCKET NO. 367.41543X00

#4/  
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Jonathan SHARP

Serial No: Unassigned

Filed: April 5, 2002

For: COMMUNICATION DEVICE

Art Unit: Unassigned

Examiner: Unassigned

**PRELIMINARY AMENDMENT**

Assistant Commissioner of Patents  
Washington, D.C. 20231

April 5, 2002

Sir:

Prior to examination of the above-identified application, please amend this new application as follows:

**IN THE SPECIFICATION**

Please replace the original specification with the Substitute Specification attached hereto. A marked-up version of the original specification identifying the amendments in the Substitute Specification is also attached. It is submitted that the amendments to the specification do not introduce new matter.

**IN THE CLAIMS**

Before calculation of the filing fee please cancel original claims 1-18 without prejudice or disclaimer and add new claims 19-37 as follows:

19. A communication device comprising a body and an attached cover having an aperture, wherein the device has a closed configuration in which portions of the body are covered and an open configuration in which at least some of the portions covered in the closed configuration are uncovered, the body comprising:

a receiver which receives data via radio transmissions;

a display operative independently of whether the cover is in the closed or open configuration and positioned such that in the open configuration the display is uncovered and positioned such that in the closed configuration the aperture is substantially aligned with the display so that at least a portion of the display is visible to a user through the aperture; and

a processor which controls the display to show received data as text, wherein when the device is in the closed configuration the processor provides the received text to the user as text which streams through the visible portion of the display.

20. A device as claimed in claim 19, wherein the text is provided as a single line of text which streams across the visible portion.
21. A device as claimed in claim 19, wherein the processor is responsive to movement of the cover from the closed position to the open position to continue to display the text but to change the format in which the text is displayed.

22. A device as claimed in claim 20, wherein the processor is responsive to movement of the cover from the closed position to the open position to continue to display the text but to change the format in which the text is displayed.
23. A device as claimed in claim 21, wherein the format in which the text is displayed is static and occupies multiple lines.
24. A device as claimed in claim 22, wherein the format in which the text is displayed is static and occupies multiple lines.
25. A device as claimed in claim 21, wherein the format in which the text is displayed is streaming and occupies multiple lines.
26. A device as claimed in claim 19, wherein the cover is opaque.
27. A device as claimed in claim 19, wherein the aperture in the cover is covered by protective transparent material.
28. A device as claimed in claim 19, wherein the cover is a flip cover which rotates about a hinge when moved between the first and second configurations.

29. A device as claimed in claim 19, wherein the portions of the body covered in the closed configuration and exposed in the open configuration include those portions of the display which are not the visible portions of the display.
30. A device as claimed in claim 19, comprising a user input wherein the portions of the body covered in the closed configuration and exposed in the open configuration include a user input means.
31. A device as claimed in claim 19, wherein the received data is a text message.
32. A device as claimed in claim 19, wherein the received data is information concerning an unanswered incoming call.
33. A device as claimed in claim 19, wherein the processor controls the display to show a message alerting the user to receipt of data.
34. A device as claimed in claim 33, comprising a button which has a function dependent upon the state of a processor, wherein when the processor is in a state which controls the display to show a message alerting the user to the receipt of data, activation of the button causes the processor to control the display to show the received data as text.

35. A device as claimed in claim 19, which is portable.
36. A device as claimed in claim 19, which functions as a radiotelephone.
37. A device as claimed in claim 19, which is sized to fit within the palm of a hand and has a input user interface without an alphanumeric/numeric keypad.

REMARKS

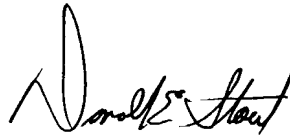
The claims have been amended to remove the multiple dependent claims before filing fee calculation and to improve their form of the claims for examination. New claims 19-37 have been added. The specification has also been amended to improve its form for examination.

To the extent necessary, Applicants petition for an extension of time under 37 C.F.R. §1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (Case No. 367.41543X00) and please credit any excess fees to such Deposit Account.

Entry of this preliminary amendment is respectfully solicited.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

A handwritten signature in black ink, appearing to read "Donald E. Stout", is written over a horizontal line.

Donald E. Stout  
Registration No. 26,422  
(703) 312-6600

DES:clt  
Attachments



10/089988

JC15 Rec'd PCT/PTO 0 5 APR 2002

VERSION SHOWING CLEAN COPY OF SPECIFICATION

## **Communication Device**

### **BACKGROUND OF THE INVENTION**

#### **Field of the Invention**

The present invention relates to a radio communications device. In particular, a device operable to providing streaming text through a visible portion of a display when in a closed configuration.

#### **Description of the Prior Art**

Mobile phones now commonly have covers or flips which cover over all or part of a phone's keypad and display. An advantage of covering the keypad but not the display is that the keypad is protected while the display is still visible but a disadvantage is that the display is exposed to damage. An advantage of covering the display and keypad is that the display is protected but a disadvantage is that the display cannot be viewed without opening the cover which cannot be done discretely. Therefore if one receives an SMS message or misses a call one cannot discretely read the message or see who has called.

It would be advantageous to improve this situation.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

For a better understanding of the present invention and to understand how the same may be brought into effect reference will now be made by way of example to the enclosed drawings in which:

Fig. 1a is a front perspective view of a phone in a closed configuration;

Fig. 1b is a side perspective view of the phone in a closed configuration;  
Fig. 2a is a front perspective view of the phone in an open configuration;  
Fig. 2b is a side perspective view of the phone in an open configuration;  
Fig. 3 is a schematic illustration of the phone;  
Fig. 4 is an illustration of the joystick of the phone;  
Fig. 5 illustrates the Menu structure in the phone;  
Fig. 6 illustrates a first method of data entry in accordance with the invention;  
Fig. 7 illustrates a second method of data entry in accordance with the invention;  
Fig. 8 is a front perspective view of the phone in an open configuration;  
Fig. 9 illustrates a third method of data entry in accordance with the invention;  
Fig. 10 illustrates a fourth method of data entry in accordance with the invention;  
Fig. 11 illustrates a method of variable scrolling speed in accordance with the invention;  
Fig. 12 is a flow chart illustrating the multiple functionality of an on/off switch of the phone;  
Fig. 13 illustrates various idle screens;  
Figs. 14 and 15 illustrate the functionality of an easy access button; and  
Fig. 16 illustrates various message screens.  
Fig. 17a illustrates how message functions can be accessed through the Menu 50;  
Fig. 17b illustrates various formats that a displayed message or displayed caller details may take;  
Fig. 18a illustrates how a message may be read when received with the cover open;  
Fig. 18b illustrates how a message may be read when received with the cover closed using the easy access key and then optionally opening the cover;  
Fig. 18c illustrates how a message may be read when received with the cover closed without using the easy access button but by opening the cover.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figs. 1 and 2 illustrate a phone 2. The phone has a body portion 4 and a cover portion 6 connected by a hinge 5. The cover is movable between a closed position as illustrated in Figs. 1a (front perspective) and 1b (side perspective) and an open position as illustrated in Figs. 2a (front perspective) and 2b (side perspective).

The body portion 4 includes a back face 7 which forms the back of the phone, lateral side faces 8a and 8b which form the sides of the phone, an upper side face 10 which forms the top side of the phone, a lower side face 12 which forms the bottom side of the phone, and a front face 14 which is exposed when the cover is in the open position and concealed when the cover is in the closed position. The body has: an antenna 16 on its upper side face 10; a microphone 18 on its lower side face 12; an open-cover button 20, a voice dial button 22, and an on/off button 24 on its side faces 8; and has a display 26 and a user input device 28 which is preferably a joystick on its front face 14. The buttons are user actuable. The body also has a hinge switch 30 (not shown) which detects the position of the cover, being actuated when the cover opens and closes.

The cover portion 6 has an exterior surface 32 which is accessible when the cover is in the closed position and an interior surface 34 which is inaccessible when the cover is in the closed position but is exposed when the cover is in the open position. The cover portion has on its exterior surface 32 an easily accessible button 36 and a speaker 38. The cover portion has on its interior surface 34 a speaker 40. The cover also has an aperture 42 extending all the way through the cover. The aperture is positioned and sized so that when the cover is in the closed position only a first portion 26a of the display 26 is visible through the aperture 42 to the user. The aperture may be covered with a transparent material to allow the user to see the first portion of the display 26a.

When the cover is in the closed position the interior surface 34 of the cover abuts with the front face 14 of the body 4. The cover is arranged and sized to enclose the input device 28 and display 26 to prevent access by the user. A portion 26a of the display 26 may, however, be viewed by a user through the aperture 36.

When the cover is in the open position the front face 14 of the body and the interior surface 34 of the cover 6 form an oblique angle of between 135 and 175 degrees. In this configuration the whole of the display 26 is exposed, the user input device 28 is exposed and the microphone 18 on the lower side face 12 of the body 4 and the speaker 40 on the interior surface 34 of the cover 6 are at their maximal separation.

The dimensions of the phone in this example are: length 60mm, width 40mm, depth 20mm approx. The display is 2.1 x 1.4 cm (84x48 pixels).

Figure 3 is a schematic illustration of the phone 2. The phone 2 has the previously described antenna 16, voice dial button 22, on/off button 24, input device (joystick) 28, hinge switch 30, easily accessible button 36, microphone 18, display 26, speakers 40 and 38. In addition the phone has a processor 44, a transceiver 46 and a memory 48. The antenna 16 is connected to the transceiver 46. The transceiver has reception circuitry for receiving radio frequency signals encoded with data. It processes the received signals as is known in the art to provide the data in digital form to the processor 50. This data may be a voice message or part of a phone conversation in which case the processor controls the speaker 40 to provide an audible output to the user. Alternatively the data may be part of an alphanumeric message in which case the processor 44 is operable to provide the message on the display. The transceiver has transmission circuitry which is provided with digital data from the processor 44 which may have been input via the microphone 18 or via the input device 28 as alphanumeric characters. The transmission circuitry produces radio frequency signals encoded with that

data. The processor is connected to memory 48 to which it can write and from which it can read. The memory 48 typically stores software which controls the functioning of the processor and the phone. In particular the software controls how the processor responds to inputs and what outputs it provides.

The processor is connected to the display 26 and to the speakers 40 and 38. It controls the output provided by these devices.

The processor is arranged to receive an input from the microphone 18, the input device (joystick) 28, the hinge switch 30, the on/off button 24, the voice dial button 22 and the easily accessible button 36.

The open cover button 20 is not illustrated in Fig. 3 as it opens the cover by mechanical as opposed to electrical action. The natural or low energy configuration for the phone is when the cover is open. The cover is biased to be in the open position. When a user closes the cover they rotate the cover on its hinge against that bias and bring the cover and body into contact. The cover is latched in this closed position. Activating the open cover button releases the latch and the cover springs open.

The antenna 16, transceiver 46, processor 44, memory 48, display 26, speaker and microphone 18 are standard features of a phone. Previously such features have operated in combination with a keypad to provide the standard functions of a phone including making a call either via a phone book or by direct character entry, receiving a call, creating and sending a message, reading a received message and maintaining a phonebook. However, in the phone 2, the features operate in combination with the joystick 28 to provide these standard functions.

Previously in the NOKIA 6110 telephone the keypad had 12 alphanumeric keys, two soft keys whose function changes and a scroll key. The functions of that phone are accessed through a Menu which is navigated using the soft

keys and the scroll key. In the phone 2, the functions of the phone are accessed through a Menu which is navigated using the joystick 28.

Fig. 4 illustrates the joystick 28 which can be moved with a user's thumb. The joystick can be pushed forward (towards the display) while simultaneously pushed to the left or right, pushed to the left or right while simultaneously pushed up or pulled back (towards the microphone), and pulled back while simultaneously being pulled left or right. In addition to each of the above movements the joystick may be simultaneously pushed inwards towards the face 14. The joystick 28 has a resting position it is resiliently biased so to return to a resting position when the user has moved or depressed the joystick and then released the joystick.

The joystick operates in two different modes. The joystick operates by default in "navigation" mode except when it is in "text editing" mode. In navigation mode there are five independent mutually exclusive activation states for the joystick.

When the joystick is pushed up, the processor performs an upward scrolling function within the current level of the Menu and updates the display accordingly. When the joystick is pulled back, the processor performs a downward scrolling function within the current level of the Menu and updates the display accordingly. These scrolling functions are the same as those scrolling functions in the NOKIA 6110. When the joystick is pushed to the left, the processor exits to the previous higher level in the Menu. When the joystick is pushed to the right, the processor presents on the display the options available to the user but in the Idle Mode it brings up the Menu. When the joystick is pushed inwards the processor enters the next level of the Menu or if there are no further levels the joystick will display the options available to the user.

Fig. 5 illustrates the layout of a Menu 50. When the phone is first switched on it enters the Idle state 54 in which the phone waits to receive a call or for user actuation. The joystick is in navigation mode. Pushing the joystick to the right enters the Menu 50. The Menu has on its first level 52 seven selectable items. These items are: Number Dial 521 which allows the user to input a number or select a number from memory for dialling; Call Divert 522 which includes options for diverting an incoming call to another number; Settings 523 which includes settings related to calls, phone and security; Profiles 524 which includes options for a user to customise the modes of phone use; Names 525 which is an editable phonebook from which calls can be made; Call Register 526 which includes a record of phone calls made; and Messages 528 which includes options for reading and composing text messages. The user can move from one item to an adjacent item by pushing the joystick up or down. The user can select an item and enter the second level 53 of the menu by pushing the joystick in. The user can return to the idle state from the first level 54 by pushing the joystick to the left.

The Menu items are the same as those in the NOKIA 6110 except that the joystick is used to navigate the Menu 100 and that due to the absence of an alphanumeric key keypad a new Number Dial item 521 is provided and new alphanumeric character entry methods are provided within each of the items where necessary.

In Idle mode the joystick has several pre-defined modes of operation. Pulling the joystick back causes the Names menu 525 to be displayed. Pressing the joystick inwards results in a shortcut to redial the last number dialled. Pressing the joystick inwards when an alphanumeric message is received causes the phone to display the Message "In Box" to read the message. Pressing the joystick inwards when an incoming call is received causes the incoming call to be answered.



The "text editing" mode of the joystick is active when alphanumeric character entry is required. In this mode the joystick operates in the same manner as an integrated cursor control device in the keyboard of a portable computer in that the joystick controls the position of a cursor or similar selector on the display 26. The joystick can additionally be pressed to accept the selected character(s).

Ⓢ

In "text editing" mode, a short press of the joystick to the left results in the deletion of the previous character. A long press to the left (1-2 seconds) causes the deletion of all the text entered so far. In this case the phone subsequently reverts to Idle mode.

A call may be made using the phone via the Names item 525, via Number Dial item 521 or via voice dial.

An incoming call may be answered, when the phone is in the closed configuration, by opening the cover. An incoming call may be answered when the phone is in the open configuration by pressing the joystick inwards. Closing the cover or by pressing the joystick inwards ends the call. When the cover is open, pushing the joystick to the left rejects the call. The content of the display is the same when an incoming call is received irrespective of whether the cover is open or closed.

Turning now to the menu structure as shown in Fig. 5, further details of the menu structure will be described with reference to Fig. 6.

A mixed menu of characters and operands for functions of the phone(e.g. to make a call) is used. In this case, the joystick is used to navigate to the Number Dial menu which is then selected by pushing the joystick inwards. A menu is displayed on the display and a user selects the numerical characters by pushing forward and pulling back the joystick as appropriate. Once the

number input is complete, the user selects the Call operand item from the menu and the call is established.

Fig. 6 shows the display 26 displaying the "Number Dial" menu item 521. In Fig. 6 a left arrow indicates that the joystick is pushed to the left, a right arrow indicates that the joystick is pushed to the right, an up arrow indicates that the joystick is pushed forward, a down arrow indicates that the joystick is pulled back and the symbol • indicates that the joystick is pushed inwards. A user selects the Number Dial option by pushing the joystick inwards (602) as described previously.

The display then changes to a text input mode with a menu 60 on the right-hand side of the display. The items of the menu 60 comprise both alphanumeric characters and operands, e.g. Call, OK, Name, Add etc. These operands can be represented textually or graphically as shown in Fig. 6. The icon 66 of a phone indicates the call operand. Thus a user can access the required functionality of the phone without having to move to a separate menu to carry out an action.

To select from the menu 60, a user scrolls through the menu (604) by pushing the joystick forward (if movement up the menu is required) or pulling the joystick back (if movement down the menu is required). Each item in the menu 60 is highlighted at the bottom right-hand corner of the display as the menu is scrolled. When the required alphanumeric character is highlighted, the user selects the character (606) by pushing the joystick inwards. The selected character 62 is then displayed on the left-hand side of the display 26, adjacent the menu 60. This action is repeated (608) until the text input is completed.

When the user has finished inputting the number, the user selects the phone icon 66 from the menu 60 by pushing the joystick inwards (610). The display

26 then changes (612) to indicate that this operand is being performed and the device proceeds to try to establish the call.

As described previously, pushing the joystick to the right at any time (614) causes the display of options available to the user at that time and pushing the joystick to the left at any time (616) causes the current menu to be exited.

Fig. 7 shows the menus available when the Name menu 525 is selected. The user is presented with the "Add Name" option 72 and inputs a name using the alphanumeric characters in the menu 70. Again the items of the menu 70 comprise both alphanumeric characters and operands, e.g. OK, Caps (for capital letters), Insert, Exit etc. Once the name has been input, the user then selects from the menu 70 the required operand e.g. OK. When this operand is selected (702) the user is presented with the "Add Number" option 74 and a menu 76 of operands and numeric characters. Once the number to be associated with the name has been entered, the user selects the required operand from the menu 76 e.g. OK and the name and number are stored (704) in the memory 48 of the phone as a phone book entry. Suitable operands are OK, Insert and Cancel.

Alternatively the menus 60, 70, 76 may be provided at the bottom of the display in a horizontal manner. The menu items may be displayed a line at a time with an up/down movement of the joystick resulting in the display of successive lines of menu items and a left/right movement of the joystick resulting in the highlighting of successive items in the line of the menu 60.

The joystick may also be used to input data directly, without the requirement for a menu of options to be displayed on the screen. For instance, the input device 28 may be used to input numeric characters. Fig. 8 shows an example of such a joystick. In Fig. 8, feedback to the user about the characters available is provided around the joystick, on the front face 14 of the body 4. Alternatively this feedback may be provided on the display 26.

In this mode, a user is prompted to use the joystick to input numbers, for instance by an image 90 on the display 26 (See Fig. 9). If the user pushes the joystick forward the numbers 1, 2 or 3 may be selected; if the user pushes the joystick to the right the numbers 4, 5 or 6 may be selected; if the user pulls the joystick back the numbers 7, 8 or 9 may be selected; if the user pushes the joystick to the left the number 0 and the characters \* and # may be selected. Pushing the joystick repeatedly in one direction causes the characters available to be scrolled through; a character may be selected either if a pre-determined time has elapsed without any further input from a user or by the user pushing the joystick inwards (902) for a short time.

Once the user has input the number by successively pushing/pulling the joystick and then pushing the joystick inwards (904-908), the user pushes the joystick inwards for a relatively long time (e.g. 1-2 seconds) (910). This causes a menu 94 to be displayed. The user selects the appropriate action by pushing the joystick inwards (912) and the device carries out the action.

In a similar manner, the joystick may be used to input alpha characters. In this mode, a user is prompted to use the joystick to input alpha characters, for instance by an image on the display 26. If the user pushes the joystick forward the characters a, b, c, d, e, f, g may be selected; if the user pushes the joystick to the right the characters h, i, j, k, l, m may be selected; if the user pulls the joystick back the characters n, o, p, q, r, s, t may be selected; if the user pushes the joystick to the left the characters u, v, w, x, y, z and "space" be selected. Pushing the joystick repeatedly in one direction causes the characters available to be scrolled through; a character may be selected either if a pre-determined time has elapsed without any further input from a user or by the user pushing the joystick inwards for a short time.

The device may be arranged to default to the mode of data input. Alternatively it may be a mode that is activated by the user selecting the option in the device's Profiles 524.

A further method of data input will now be described with reference to Fig. 10. A user scrolls through a list of characters 100 in blocks of three 102 by pushing the joystick forward or pulling the joystick back. The user selects a character by then pushing the joystick to the right (104) until the required character is highlighted and then pushing the joystick inwards (105) for a short time. When the user has inputted the entire item, the user pushes the joystick inwards (106) for a relatively long time. A menu 108 of actions is then displayed and the user selects the appropriate one by pushing the joystick inwards.

According to a further aspect of the invention, the speed of scrolling is determined by the position of the joystick as illustrated in Fig. 11. A selectable item is highlighted as the items in a menu are scrolled through. A single movement of the joystick up or down (110) causes a display (menu or text) to be scrolled through by one line at a time. Thus in Fig. 11 the highlighted item will change from Bruce to Carl. Pushing the joystick inwards (111) selects this item.

Moving the joystick up or down and holding the joystick in this position (112) causes the item to be scrolled through continuously e.g. the names Bruce, Carl, Diana, Fiona, ...Graham, Guy will be scrolled through in a continuous manner until the joystick is released. Pushing the joystick inwards (111) selects the highlighted item.

Moving the joystick up or down and holding the joystick in this position whilst also pressing in on the joystick (113) results in a higher speed of continuous scrolling. Thus the display changes from Graham, Guy, Helen to further down the menu (e.g. Susa, Tom, Trevor) faster than previously. Thus a user can quickly scroll through a long list until the general region of the required item is located and then release the inward pressure on the joystick to cause the speed of scrolling to reduce. The joystick can then be held in the up (or

down) position until the required item is located. The joystick is released and pushing the joystick inwards (111) then selects the highlighted item.

The hinge switch 30 is activated when the cover 6 is opened and is activated when the cover is closed. The switch detects when the interior surface 34 of the cover 6 makes a specific acute angle (for example 5 degrees) with the front face 14 of the body 4. The processor maintains a register which changes state when the hinge switch is activated. The processor is therefore aware of whether the cover is in the open or closed position. The processor also detects via the hinge switch 30 when the cover is opened and when the cover is closed.

Turning now to the on/off button 24 of the phone, illustrated in Fig. 3, this button has multiple functionality. In this embodiment, the functionality is determined by the manner of actuation of the button 24 and/or the state of the phone. Fig. 12 illustrates how the processor 50 determines which function to perform when the on/off button is actuated.

The processor waits for actuation of the on/off button 24 by the user (Step120). When the button is actuated, the processor 50 proceeds to Step 121. In this case, the processor 50 responds differently when the button is depressed and released (short press) compared with when the button is held in a depressed position and then released (long press). The processor senses the input from the button. When the button is activated the processor starts a timer. When the button is deactivated the processor stops the timer. If the count of the timer is less than a predetermined threshold the processor determines that the user employed a short press and wishes to access a function or function associated with that method. Consequently, the processor moves to step 122.

Alternatively, if the count of the timer is equal to or more than a predetermined threshold (typically 1-2 seconds) the processor determines that the user

employed a long press (Step 125). In this case, a long press is indicative of a power off function, and consequently, the processor performs this function in a conventional manner.

Turning back now to Step 122, the short press is not indicative of a single function. Instead, the function depends upon the state of the phone. If not in Idle mode 54 then the processor exits all menus and returns the phone to Idle mode 54 (Step 124). On the other hand, if the phone is already in Idle mode 54 then the processor performs a shortcut into the profiles menu (Step 123) which may also be entered via item 124. When in the Idle mode the on/off button has the same functionality as that in the NOKIA 6110 in the Idle mode.

The voice dial button 22 allows a user to dial a number using voice commands when the phone is in the Idle state.

In this embodiment, the display contains different information when in the idle state, depending on the circumstances of the phone. Fig. 13 illustrates different examples: Fig. 13 (a) shows different information presented on the display depending on whether the cover is in the open or closed position, and Fig. 13(b) shows alternative idle screens when the cover is in the closed position a headset is coupled to the phone.

Fig. 13(a) illustrates the idle screen as appearing on a visible area 131 of the display and on the whole display 132, when the cover is in the closed position. It also illustrates the screen as it appears on the display when the cover is in its open position.

As can be seen, when the cover is in the closed position, the content of the idle screen is reduced from that apparent when the cover is in its open position, to key information such as network signal strength, battery and time and this information is centered in the display. The format as opposed to the content is also changed. In the closed position the battery and signal

indicators are of a rounded design extending towards the center of the display, whereas in the open position they are of a linear design. The content of the screen is therefore more centered, simpler, clearer and contains less information when the cover is closed compared to when open.

Fig. 13(b) illustrates idle screens 134 and 135 as appearing on a visible area of the display when a headset is coupled to the phone. In this case, for an initial period, a first idle screen 134 is presented, that comprises the word "Headset" and icon of a headset. After this period, the processor controls the display to present a second idle screen 135 in which the word "Headset" is replaced with the time.

Idle mode screen may depend upon the placement or use of the product. For example, if the phone is a wrist-worn device its idle screen may have prominent watch functions such as time zones, alarms or analogue looking clock faces. Similarly, personalisable wearable products may have user defined bitmaps.

Easy access button 36 has multiple functionality when the phone is in the closed configuration and no function, the access button is disabled, when the cover is opened. In this context, multiple functionality does not mean that the button has multiple functions simultaneously, the access button does not. At any time, the button 36 has only a single function. However, that single function may be one of many depending upon the state of the phone. Generally, actuation of the button provides the most likely response to a given situation. The button does not delete or change things. If the alarm rings, activation ends the ringing. If there is an incoming call activation mutes the ringing. If a message has just been received activation opens the message. If a call has just been missed activation gives the caller's details. If the phone is in the Idle state, activation redials the last dialled number.



If the processor 50 determines that, when the key is actuated, the phone is either in the incoming call state (decision 151) or the alarm state (decision 152), then the processor disables the audible indicator or speaker 38 (Step 156). Alternatively, if the processor 50 determines that, when the key is actuated, a headset is attached to the device (decision 153) or the phone is in the idle state (decision 151), then the processor accesses the last number redial menu. The processor also displays the last number redial option on the display 26.

The processor causes the received message to be displayed (Step 158) if the phone is in the message received state (decision 155) when the easy access key is actuated. Next, the processor determines whether the message displayed is the only one received. (Step 159). If the displayed message is the received message, then once the message has been fully displayed, the processor returns the phone to its idle state (Step 146). However, if there is a further message, the processor waits for a further actuation of the easy access key (Step 145). ). If the key is not actuated within a predetermined period, then the processor returns the phone to its idle state (Step 146). However, on the other hand, if the key is actuated within the predetermined period, then the further message is displayed (Step 158). Steps 158, 159 and 145 are repeated until all messages have been displayed or the easy access key is not actuated within the predetermined period.

Fig. 16 illustrates two message screens, as viewed when the cover is in its closed position. When a message is received, the state of the phone changes to the message received state. In response to this change, the processor causes the display to present the content as illustrated by the view 161. Then, once the easy access key (external button) is actuated, the message starts scrolling across the display, as illustrated by the view 162. In this embodiment, the information displayed contains the name or number of the message sender, followed by the message. Actuating the key again will cause the next message to be scrolled across the display, and so on. Once the last message has scrolled, a further actuation of the easy access key results in the phone returning to its idle state.

The procedure for dealing with a missed call or calls is similar to that for dealing with a received message or messages. When a call has been missed the caller details are stored in the phone's memory and the state of the phone changes to a missed call state. In response to this change the processor causes the display to present text indicating that a call or calls have been

missed – e.g. “1 call missed”, “2. calls missed” etc. Then, when the easy access key is actuated, the processor retrieves the caller’s details from memory and provides them as text scrolling across the display. The callers details are also be displayed automatically if the cover is opened instead of pressing the easy access key. The details may be displayed in a static or scrolling format as described later for the display of text messages (Fig. 17b).

Some functionality associated with movement of the cover has already being described such as: answering an incoming call by opening the cover, ending a call in progress by closing the cover and the change in the content of the display when the phone is in the idle mode effected by opening and closing the cover. A further function associated with the active flip is when the phone is within an item of the menu, closing the flip will return the phone to the idle state. Opening the cover also has functionality in connection with reading received messages.

The process of accessing messages through the menu structure is illustrated in Fig. 17. Selecting Messages 528 from within the Menu 50 by scrolling up or down using the joystick and then pushing the joy stick inwards, displays all the messaging options 171: Inbox which stores received messages, Write which allows the composition of messages, Outbox which stores sent messages, Templates which stores pro-form messages or the like and Archive in which messages may be stored from the Inbox and Outbox. The icon next to In box contains an arrow indicating it contains a new (unread) message. Selecting the Inbox within the messaging options 171 by scrolling up or down if necessary to highlight “Inbox” and the then pressing the joystick in, displays the contents of the Inbox 172. The contents of the Inbox is a number of messages. The icon next to Colin indicates that this is an unread message. Selecting the message Colin from within the Inbox 172 by scrolling up or down as necessary using the joystick and then pushing the joystick in, displays the contents of the message 173. Pressing the joystick in again provides a number of options 174 such as erase, edit, archive etc. Selection of the

appropriate item by scrolling using the joystick and then pushing the joystick in performs the appropriate function. In the example, erase is selected and the erase function performed. The display then returns to the Inbox 172 if there are any remaining unread messages or to the options 171 if there are not.

The format of the message displayed in 173 may take various forms as illustrated in Fig. 17b. The message may be static 176, with the user able to scroll up and down through the message by pushing the joystick up or pulling it down. The message may occupy several lines with it scrolling through the display word by word 177. For example, as a word disappears from the screen on the first line at the top left the whole message moves so that the next word is positioned at the top left hand corner of the display and one or more words are appear on the display at the bottom right hand corner. As another alternative 178 the message may occupy a single line and scroll across the screen one character at a time as if the display where a fixed window with the message passing by as if printed on a tape moving at a constant speed past that window.

When a message is received while the cover is open, the processor enters a message received state and the Idle display changes to indicate that a message has been received. This is illustrated as 180 in Fig. 18. Pushing the joystick inwards enters the Inbox 172. Pushing the joystick to the left, returns the display to the Idle mode. The up, down and right movements of the joystick have the same functions as in this received message state as in the Idle Mode.

When a message is received and the cover is closed there are two ways of accessing the message: pressing the easy access key and opening the cover.

As previously described with reference to Fig. 16, when a message has been received with the phone in the closed configuration, and the easy access key (external button) is actuated, the content of the message is scrolled across

the display portion as a single line one character at a time in a manner similar to that described in relation to format 178 of Fig. 17b. If the cover is then opened the format of the display changes. This is illustrated in Fig. 18b. The text no longer scrolls across the display in a single line, but is preferable displayed in a static format 176 or scrolling format 177 several lines at a time. If the message is displayed in a static format 176, it does not scroll automatically but the contents can be viewed by scrolling through the message using the joystick. Pushing the joystick upwards scrolls upwards through the message. Pulling the joystick downwards scrolls downwards through the message.

When a message is received and the cover is closed, the phone enters a message received state 161 as illustrated in Fig. 16. If the cover is then opened, the phone then enters state 73 illustrated in Fig. 17a and displays the content of the message received. The format of the content may vary and may be static 176, multiple line and scrolling 177 or single line and scrolling as previously described with reference to Fig. 17b. This process is illustrated in Fig. 18c.

The voice dial button 22 allows a user to dial a number using voice commands when the phone is in the Idle state.

Although the user input device 28 has been described with reference to a joystick, the invention is also applicable to other user input devices e.g. a roller or rocker key that is moveable up, down, left, right and inwards.

The present invention may include any novel feature or combination of features described herein either explicitly or implicitly or any generalisation thereof whether or not it relates to the present claimed invention or mitigates any or all of the problems addressed. In view of the foregoing description it will be evident to a person skilled in the art that various modifications may be made within the scope of the invention.

# ABSTRACT

A communications device comprising a body and an attached cover having an aperture, wherein the device has a closed configuration in which portions of the body are covered and an open configuration in which at least some of the portions covered in the closed configuration are uncovered, the body comprising receiver means for receiving data via radio transmissions; a display operative independent of whether the cover is in the closed or open configuration and positioned such that in the open configuration the display is uncovered and positioned such that in the closed configuration the aperture is substantially aligned with the display so that at least a portion of the display is visible to a user through the aperture; and a processor arranged to control the display and operable to show received data as text, wherein when the device is in the closed configuration the processor is operable to provide the received text to the user as text which streams through said visible portion of the display.

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VERSION SHOWING CHANGES MADE TO SPECIFICATION

WO 01/28191

**Communication Device***BACKGROUND OF THE INVENTION*  
*Field of the Invention*

- 5 The present invention relates to a radio communications device. In particular, a device operable to providing streaming text through a visible portion of a display when in a closed configuration.

*Description of the Prior Art*

- 10 Mobile phones now commonly have covers or flips which cover over all or part of a phone's keypad and display. An advantage of covering the keypad but not the display is that the keypad is protected while the display is still visible but a disadvantage is that the display is exposed to damage. An advantage of covering the display and keypad is that the display is protected but a disadvantage is that the display cannot be viewed without opening the cover
- 15 which cannot be done discretely. Therefore if one receives an SMS message or misses a call one cannot discretely read the message or see who has called.

It would be advantageous to improve this situation.

20

[According to one aspect of the present invention there is provided a communications device as claimed in claim 1.

- 25 According to various embodiments of the invention there are provided devices as claimed in the dependent claims.]

*BRIEF DESCRIPTION OF THE DRAWINGS*

For a better understanding of the present invention and to understand how the same may be brought into effect reference will now be made by way of example to the enclosed drawings in which:

30



- Figure 1a is a front perspective view of a phone in a closed configuration;  
Figure 1b is a side perspective view of the phone in a closed configuration;  
Figure 2a is a front perspective view of the phone in an open configuration;  
Figure 2b is a side perspective view of the phone in an open configuration;
- 5 Figure 3 is a schematic illustration of the phone;  
Figure 4 is an illustration of the joystick of the phone;  
Figure 5 illustrates the Menu structure in the phone;  
Figure 6 illustrates a first method of data entry in accordance with the invention;
- 10 Figure 7 illustrates a second method of data entry in accordance with the invention;  
Figure 8 is a front perspective view of the phone in an open configuration;  
Figure 9 illustrates a third method of data entry in accordance with the invention;
- 15 Figure 10 illustrates a fourth method of data entry in accordance with the invention;  
Figure 11 illustrates a method of variable scrolling speed in accordance with the invention;  
Figure 12 is a flow chart illustrating the multiple functionality of an on/off
- 20 switch of the phone;  
Figure 13 illustrates various idle screens;  
Figures 14 and 15 illustrate the functionality of an easy access button; and  
Figure 16 illustrates various message screens.
- Figure 17a illustrates how message functions can be accessed through the
- 25 Menu 50;  
Figure 17b illustrates various formats that a displayed message or displayed caller details may take;  
Figure 18a illustrates how a message may be read when received with the cover open;

Figure 18b illustrates how a message may be read when received with the cover closed using the easy access key and then optionally opening the cover;

Figure 18c illustrates how a message may be read when received with the cover closed without using the easy access button but by opening the cover.

*DESCRIPTION OF THE PREFERRED EMBODIMENTS*

Figures 1 and 2 illustrate a phone 2. The phone has a body portion 4 and a cover portion 6 connected by a hinge 5. The cover is movable between a closed position as illustrated in Figures 1a (front perspective) and 1b (side perspective) and an open position as illustrated in Figures 2a (front perspective) and 2b (side perspective).

The body portion 4 includes a back face 7 which forms the back of the phone, lateral side faces 8a and 8b which form the sides of the phone, an upper side face 10 which forms the top side of the phone, a lower side face 12 which forms the bottom side of the phone, and a front face 14 which is exposed when the cover is in the open position and concealed when the cover is in the closed position. The body has: an antenna 16 on its upper side face 10; a microphone 18 on its lower side face 12; an open-cover button 20, a voice dial button 22, and an on/off button 24 on its side faces 8; and has a display 26 and a user input device 28 which is preferably a joystick on its front face 14. The buttons are user actuatable. The body also has a hinge switch 30 (not shown) which detects the position of the cover, being actuated when the cover opens and closes.

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The cover portion 6 has an exterior surface 32 which is accessible when the cover is in the closed position and an interior surface 34 which is inaccessible when the cover is in the closed position but is exposed when the cover is in the open position. The cover portion has on its exterior surface 32 an easily accessible button 36 and a speaker 38. The cover portion has on its interior

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surface 34 a speaker 40. The cover also has an aperture 42 extending all the way through the cover. The aperture is positioned and sized so that when the cover is in the closed position only a first portion 26a of the display 26 is visible through the aperture 42 to the user. The aperture may be covered with  
5 a transparent material to allow the user to see the first portion of the display 26a.

When the cover is in the closed position the interior surface 34 of the cover abuts with the front face 14 of the body 4. The cover is arranged and sized to  
10 enclose the input device 28 and display 26 to prevent access by the user. A portion 26a of the display 26 may, however, be viewed by a user through the aperture 36.

When the cover is in the open position the front face 14 of the body and the  
15 interior surface 34 of the cover 6 form an oblique angle of between 135 and 175 degrees. In this configuration the whole of the display 26 is exposed, the user input device 28 is exposed and the microphone 18 on the lower side face 12 of the body 4 and the speaker 40 on the interior surface 34 of the cover 6 are at their maximal separation.

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The dimensions of the phone in this example are : length 60mm, width 40mm, depth 20mm approx. The display is 2.1 x 1.4 cm (84x48 pixels).

~~Figure~~ 3 is a schematic illustration of the phone 2. The phone 2 has the  
25 previously described antenna 16, voice dial button 22, on/off button 24, input device (joystick) 28, hinge switch 30, easily accessible button 36, microphone 18, display 26, speakers 40 and 38. In addition the phone has a processor 44, a transceiver 46 and a memory 48. The antenna 16 is connected to the transceiver 46. The transceiver has reception circuitry for receiving radio  
30 frequency signals encoded with data. It processes the received signals as is

known in the art to provide the data in digital form to the processor 50. This data may be a voice message or part of a phone conversation in which case the processor controls the speaker 40 to provide an audible output to the user. Alternatively the data may be part of an alphanumeric message in which case the processor 44 is operable to provide the message on the display. The transceiver has transmission circuitry which is provided with digital data from the processor 44 which may have been input via the microphone 18 or via the input device 28 as alphanumeric characters. The transmission circuitry produces radio frequency signals encoded with that data. The processor is connected to memory 48 to which it can write and from which it can read. The memory 48 typically stores software which controls the functioning of the processor and the phone. In particular the software controls how the processor responds to inputs and what outputs it provides.

15 The processor is connected to the display 26 and to the speakers 40 and 38. It controls the output provided by these devices.

The processor is arranged to receive an input from the microphone 18, the input device (joystick) 28, the hinge switch 30, the on/off button 24, the voice dial button 22 and the easily accessible button 36.

The open cover button 20 is not illustrated in Figure 3 as it opens the cover by mechanical as opposed to electrical action. The natural or low energy configuration for the phone is when the cover is open. The cover is biased to be in the open position. When a user closes the cover they rotate the cover on its hinge against that bias and bring the cover and body into contact. The cover is latched in this closed position. Activating the open cover button releases the latch and the cover springs open.

## 6

The antenna 16, transceiver 46, processor 44, memory 48, display 26, speaker and microphone 18 are standard features of a phone. Previously such features have operated in combination with a keypad to provide the standard functions of a phone including making a call either via a phone book or by direct character entry, receiving a call, creating and sending a message, reading a received message and maintaining a phonebook. However, in the phone 2, the features operate in combination with the joystick 28 to provide these standard functions.

Previously in the NOKIA 6110 telephone the keypad had 12 alphanumeric keys, two soft keys whose function changes and a scroll key. The functions of that phone are accessed through a Menu which is navigated using the soft keys and the scroll key. In the phone 2, the functions of the phone are accessed through a Menu which is navigated using the joystick 28.

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Figure 4 illustrates the joystick 28 which can be moved with a user's thumb. The joystick can be pushed forward (towards the display) while simultaneously pushed to the left or right, pushed to the left or right while simultaneously pushed up or pulled back (towards the microphone), and pulled back while simultaneously being pulled left or right. In addition to each of the above movements the joystick may be simultaneously pushed inwards towards the face 14. The joystick 28 has a resting position and it is resiliently biased so that it returns to its resting position when the user has moved it or depressed it and then released it.

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The joystick operates in two different modes. The joystick operates by default in "navigation" mode except when it is in "text editing" mode. In navigation mode there are five independent mutually exclusive activation states for the joystick.

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When the joystick is pushed up, the processor performs an upward scrolling function within the current level of the Menu and updates the display accordingly. When the joystick is pulled back, the processor performs a downward scrolling function within the current level of the Menu and updates the display accordingly. These scrolling functions are the same as those scrolling functions in the NOKIA 6110. When the joystick is pushed to the left, the processor exits to the previous higher level in the Menu. When the joystick is pushed to the right, the processor presents on the display the options available to the user but in the Idle Mode it brings up the Menu. When the joystick is pushed inwards the processor enters the next level of the Menu or if there are no further levels <sup>the joystick</sup> it will display the options available to the user.

Figure 5 illustrates the layout of a Menu 50. When the phone is first switched on it enters the Idle state 54 in which <sup>the phone</sup> it waits to receive a call or for user actuation. The joystick is in navigation mode. Pushing the joystick to the right enters the Menu 50. The Menu has on its first level 52 seven selectable items. These items are: Number Dial 521 which allows the user to input a number or select a number from memory for dialling; Call Divert 522 which includes options for diverting an incoming call to another number; Settings 523 which includes settings related to calls, phone and security; Profiles 524 which includes options for a user to customise the modes of phone use; Names 525 which is an editable phonebook from which calls can be made; Call Register 526 which includes a record of phone calls made; and Messages 528 which includes options for reading and composing text messages. The user can move from one item to an adjacent item by pushing the joystick up or down. The user can select an item and enter the second level 53 of the menu by pushing the joystick in. The user can return to the idle state from the first level 54 by pushing the joystick to the left.

The Menu items are the same as those in the NOKIA 6110 except that the joystick is used to navigate the Menu 100 and that due to the absence of an alphanumeric key keypad a new Number Dial item 521 is provided and new alphanumeric character entry methods are provided within each of the items  
5 where necessary.

In Idle mode the joystick has several pre-defined modes of operation. Pulling the joystick back causes the Names menu 525 to be displayed. Pressing the joystick inwards results in a shortcut to redial the last number dialled.  
10 Pressing the joystick inwards when an alphanumeric message is received causes the phone to display the Message "In Box" to read the message. Pressing the joystick inwards when an incoming call is received causes the incoming call to be answered.

15 The "text editing" mode of the joystick is active when alphanumeric character entry is required. In this mode the joystick operates in the same manner as an integrated cursor control device in the keyboard of a portable computer in that <sup>the joystick</sup> it controls the position of a cursor or similar selector on the display 26. The joystick can additionally be pressed to accept the selected character(s).

20 In "text editing" mode, a short press of the joystick to the left results in the deletion of the previous character. A long press to the left (1-2 seconds) causes the deletion of all the text entered so far. In this case the phone subsequently reverts to Idle mode.

25 A call may be made using the phone via the Names item 525, via Number Dial item 521 or via voice dial.

An incoming call may be answered, when the phone is in the closed  
30 configuration, by opening the cover. An incoming call may be answered when

the phone is in the open configuration by pressing the joystick inwards. Closing the cover or by pressing the joystick inwards ends the call. When the cover is open, pushing the joystick to the left rejects the call. The content of the display is the same when an incoming call is received irrespective of whether the cover is open or closed.

Turning now to the menu structure as shown in Figure 5, further details of the menu structure will be described with reference to Figure 6.

A mixed menu of characters and operands for functions of the phone (e.g. to make a call) is used. In this case, the joystick is used to navigate to the Number Dial menu which is then selected by pushing the joystick inwards. A menu is displayed on the display and a user selects the numerical characters by pushing forward and pulling back the joystick as appropriate. Once the number input is complete, the user selects the Call operand item from the menu and the call is established.

Figure 6 shows the display 26 displaying the "Number Dial" menu item 521. In Figure 6 a left arrow indicates that the joystick is pushed to the left, a right arrow indicates that the joystick is pushed to the right, an up arrow indicates that the joystick is pushed forward, a down arrow indicates that the joystick is pulled back and the symbol • indicates that the joystick is pushed inwards. A user selects the Number Dial option by pushing the joystick inwards (602) as described previously.

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The display then changes to a text input mode with a menu 60 on the right-hand side of the display. The items of the menu 60 comprise both alphanumeric characters and operands, e.g. Call, OK, Name, Add etc. These operands can be represented textually or graphically as shown in Figure 6.

30 The icon 66 of a phone indicates the call operand. Thus a user can access



the required functionality of the phone without having to move to a separate menu to carry out an action.

To select from the menu 60, a user scrolls through the menu (604) by pushing  
5 the joystick forward (if movement up the menu is required) or pulling the joystick back (if movement down the menu is required). Each item in the menu 60 is highlighted at the bottom right-hand corner of the display as the menu is scrolled. When the required alphanumeric character is highlighted, the user selects the character (606) by pushing the joystick inwards. The  
10 selected character 62 is then displayed on the left-hand side of the display 26, adjacent the menu 60. This action is repeated (608) until the text input is completed.

When the user has finished inputting the number, the user selects the phone  
15 icon 66 from the menu 60 by pushing the joystick inwards (610). The display 26 then changes (612) to indicate that this operand is being performed and the device proceeds to try to establish the call.

As described previously, pushing the joystick to the right at any time (614) causes the display of options available to the user at that time and pushing  
20 the joystick to the left at any time (616) causes the current menu to be exited.

Figure 7 shows the menus available when the Name menu 525 is selected. The user is presented with the "Add Name" option 72 and inputs a name using the alphanumeric characters in the menu 70. Again the items of the  
25 menu 70 comprise both alphanumeric characters and operands, e.g. OK, Caps (for capital letters), Insert, Exit etc. Once the name has been input, the user then selects from the menu 70 the required operand e.g. OK. When this operand is selected (702) the user is presented with the "Add Number" option 74 and a menu 76 of operands and numeric characters. Once the number to  
30 be associated with the name has been entered, the user selects the required

operand from the menu 76 e.g. OK and the name and number are stored (704) in the memory 48 of the phone as a phone book entry. Suitable operands are OK, Insert and Cancel.

- 5 Alternatively the menus 60, 70, 76 may be provided at the bottom of the display in a horizontal manner. The menu items may be displayed a line at a time with an up/down movement of the joystick resulting in the display of successive lines of menu items and a left/right movement of the joystick resulting in the highlighting of successive items in the line of the menu 60.

10

The joystick may also be used to input data directly, without the requirement for a menu of options to be displayed on the screen. For instance, the input device 28 may be used to input numeric characters. Figure 8 shows an example of such a joystick. In Figure 8, feedback to the user about the characters available is provided around the joystick, on the front face 14 of the body 4. Alternatively this feedback may be provided on the display 26.

15

In this mode, a user is prompted to use the joystick to input numbers, for instance by an image 90 on the display 26 (see Figure 9). If the user pushes the joystick forward the numbers 1, 2 or 3 may be selected; if the user pushes the joystick to the right the numbers 4, 5 or 6 may be selected; if the user pulls the joystick back the numbers 7, 8 or 9 may be selected; if the user pushes the joystick to the left the number 0 and the characters \* and # may be selected. Pushing the joystick repeatedly in one direction causes the characters available to be scrolled through; a character may be selected either if a pre-determined time has elapsed without any further input from a user or by the user pushing the joystick inwards (902) for a short time.

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Once the user has input the number by successively pushing/pulling the joystick and then pushing the joystick inwards (904-908), the user pushes the

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joystick inwards for a relatively long time (e.g. 1-2 seconds) (910). This causes a menu 94 to be displayed. The user selects the appropriate action by pushing the joystick inwards (912) and the device carries out the action.

In a similar manner, the joystick may be used to input alpha characters. In  
5 this mode, a user is prompted to use the joystick to input alpha characters, for instance by an image on the display 26. If the user pushes the joystick forward the characters a, b, c, d, e, f, g may be selected; if the user pushes the joystick to the right the characters h, i, j, k, l, m may be selected; if the user pulls the joystick back the characters n, o, p, q, r, s, t may be selected; if  
10 the user pushes the joystick to the left the characters u, v, w, x, y, z and "space" be selected. Pushing the joystick repeatedly in one direction causes the characters available to be scrolled through; a character may be selected either if a pre-determined time has elapsed without any further input from a user or by the user pushing the joystick inwards for a short time.

15

The device may be arranged to default to the mode of data input. Alternatively it may be a mode that is activated by the user selecting the option in the device's Profiles 524.

20 A further method of data input will now be described with reference to Figure 10. A user scrolls through a list of characters 100 in blocks of three 102 by pushing the joystick forward or pulling the joystick back. The user selects a character by then pushing the joystick to the right (104) until the required character is highlighted and then pushing the joystick inwards (105) for a short  
25 time. When the user has inputted the entire item, the user pushes the joystick inwards (106) for a relatively long time. A menu 108 of actions is then displayed and the user selects the appropriate one by pushing the joystick inwards.

According to a further aspect of the invention, the speed of scrolling is determined by the position of the joystick as illustrated in Figure 11. A selectable item is highlighted as the items in a menu are scrolled through. A single movement of the joystick up or down (110) causes a display (menu or text) to be scrolled through by one line at a time. Thus in Figure 11 the highlighted item will change from Bruce to Carl. Pushing the joystick inwards (111) selects this item.

Moving the joystick up or down and holding *the joystick* it in this position (112) causes the item to be scrolled through continuously e.g. the names Bruce, Carl, Diana, Fiona, ... Graham, Guy will be scrolled through in a continuous manner until the joystick is released. Pushing the joystick inwards (111) selects the highlighted item.

Moving the joystick up or down and holding *the joystick* it in this position whilst also pressing in on the joystick (113) results in a higher speed of continuous scrolling. Thus the display changes from Graham, Guy, Helen to further down the menu (e.g. Susa, Tom, Trevor) faster than previously. Thus a user can quickly scroll through a long list until the general region of the required item is located and then release the inward pressure on the joystick to cause the speed of scrolling to reduce. The joystick can then be held in the up (or down) position until the required item is located. The joystick is released and pushing the joystick inwards (111) then selects the highlighted item.

The hinge switch 30 is activated when the cover 6 is opened and is activated when the cover is closed. The switch detects when the interior surface 34 of the cover 6 makes a specific acute angle (for example 5 degrees) with the front face 14 of the body 4. The processor maintains a register which changes state when the hinge switch is activated. The processor is therefore aware of whether the cover is in the open or closed position. The processor also

detects via the hinge switch 30 when the cover is opened and when the cover is closed.

Turning now to the on/off button 24 of the phone, illustrated in ~~Figure 3~~, this button has multiple functionality. In this embodiment, the functionality is determined by the manner of actuation of the button 24 and/or the state of the phone. ~~Figure 12~~ illustrates how the processor 50 determines which function to perform when the on/off button is actuated.

10 The processor waits for actuation of the on/off button 24 by the user (Step 120). When the button is actuated, the processor 50 proceeds to Step 121. In this case, the processor 50 responds differently when the button is depressed and released (short press) compared with when the button is held in a depressed position and then released (long press). The processor  
15 senses the input from the button. When the button is activated the processor starts a timer. When the button is deactivated the processor stops the timer. If the count of the timer is less than a predetermined threshold the processor determines that the user employed a short press and wishes to access a function or function associated with that method. Consequently, the  
20 processor moves to step 122.

Alternatively, if the count of the timer is equal to or more than a predetermined threshold (typically 1-2 seconds) the processor determines that the user employed a long press (Step 125). In this case, a long press is indicative of a  
25 power off function, and consequently, the processor performs this function in a conventional manner.

Turning back now to Step 122, the short press is not indicative of a single function. Instead, the function depends upon the state of the phone. If not in  
30 Idle mode 54 then the processor exits all menus and returns the phone to Idle

15

mode 54 (Step 124). On the other hand, if the phone is already in Idle mode 54 then the processor performs a shortcut into the profiles menu (Step 123) which may also be entered via item 124. When in the Idle mode the on/off button has the same functionality as that in the NOKIA 6110 in the Idle mode.

5

The voice dial button 22 allows a user to dial a number using voice commands when the phone is in the Idle state.

10 In this embodiment, the display contains different information when in the idle state, depending on the circumstances of the phone. ~~Figure~~ 13 illustrates different examples: ~~Figure~~ 13 (a) shows different information presented on the display depending on whether the cover is in the open or closed position, and ~~Figure~~ 13(b) shows alternative idle screens when the cover is in the closed position a headset is coupled to the phone.

15

~~Figure~~ 13(a) illustrates the idle screen as <sup>ing</sup> it appears on a visible area 131 of the display and on the whole display 132, when the cover is in the closed position. It also illustrates the screen as it appears on the display when the cover is in its open position.

20

As can be seen, when the cover is in the closed position, the content of the idle screen is reduced from that apparent when the cover is in its open position, to key information such as network signal strength, battery and time and this information is centred<sup>ered</sup> in the display. The format as opposed to the content is also changed. In the closed position the battery and signal indicators are of a rounded design extending towards the centre<sup>er</sup> of the display, whereas in the open position they are of a linear design. The content of the screen is therefore more centred<sup>ered</sup>, simpler, clearer and contains less information when the cover is closed compared to when it<sup>is</sup> open.

30

Figure 13(b) illustrates idle screens 134 and 135 as ~~they~~<sup>my</sup> appear on a visible area of the display when a headset is coupled to the phone. In this case, for an initial period, a first idle screen 134 is presented, that comprises the word "Headset" and icon of a headset. After this period, the processor controls the display to present a second idle screen 135 in which the word "Headset" is replaced with the time.

Idle mode screen may depend upon the placement or use of the product. For example, if the phone is a wrist-worn device its idle screen may have prominent watch functions such as time zones, alarms or analogue looking clock faces. Similarly, personalisable wearable products may have user defined bitmaps.

Easy access button 36 has multiple functionality when the phone is in the closed configuration and no function, ~~it~~<sup>the screen button</sup> is disabled, when the cover is opened. In this context, multiple functionality does not mean that the button has multiple functions simultaneously, ~~it~~<sup>the button</sup> does not. At any time, the button 36 has only a single function. However, that single function may be one of many depending upon the state of the phone. Generally, ~~activation~~<sup>The button</sup> of the button provides the most likely response to a given situation. ~~It~~ does not delete or change things. If the alarm rings, activation ends the ringing. If there is an incoming call activation mutes the ringing. If a message has just been received activation opens the message. If a call has just been missed activation gives the caller's details. If the phone is in the Idle state, activation redials the last dialled number.

Figures 14 and 15 illustrate how the processor 50 determines which function to perform when the easy access button 36 is actuated.

Firstly, the processor 50 determines whether the phone's cover is in its closed position (Step 141). If <sup>the cover</sup> it is, the processor waits for actuation of the easy access key by the user (Step 142). However, if the phone is in its open configuration, then the processor disables the easy access key (Step 144).

5 This disablement may be complete or partial disablement of the phone. Complete disablement may, for example include the processor not responding at all to key actuation, so that even display backlighting, audible indications and the like, which generally occur upon key actuation, are not performed. Partial disablement, on the other hand, may merely be disablement of the

10 actual function or functions associated with the key.

If the processor detects actuation of the easy access key, the processor proceeds from Step 142 to Step 143. Step 143 includes the determination by the processor of the state of the phone and the performance of the

15 consequential function. This is further explained with reference to Figure 15.

In this embodiment, the easy access key has a plurality of functions, depending upon the phone being in one of five states when the key is actuated. These five states are incoming call, alarm, headset attached, idle

20 and message received, as explained briefly above.

If the processor 50 determines that, when the key is actuated, the phone is either in the incoming call state (decision 151) or the alarm state (decision 152), then the processor disables the audible indicator or speaker 38 (Step

25 156). Alternatively, if the processor 50 determines that, when the key is actuated, a headset is attached to the device (decision 153) or the phone is in the idle state (decision 151), then the processor accesses the last number redial menu. <sup>The processor</sup> It also displays the last number redial option on the display 26.



The processor causes the received message to be displayed (Step 158) if the phone is in the message received state (decision 155) when the easy access key is actuated. Next, the processor determines whether the message displayed is the only one received. (Step 159). If *it is, then once the* ~~it is~~ *displayed message is the received message* the message has been fully displayed, the processor returns the phone to its idle state (Step 146). However, if there is a further message, the processor waits for a further actuation of the easy access key (Step 145). ). If the key is not actuated within a predetermined period, then the processor returns the phone to its idle state (Step 146). However, on the other hand, if the key is actuated within the predetermined period, then the further message is displayed (Step 158). Steps 158, 159 and 145 are repeated until all messages have been displayed or the easy access key is not actuated within the predetermined period.

Figure 16 illustrates two message screens, as viewed when the cover is in its closed position. When a message is received, the state of the phone changes to the message received state. In response to this change, the processor causes the display to present the content as illustrated by the view 161. Then, once the easy access key (external button) is actuated, the message starts scrolling across the display, as illustrated by the view 162. In this embodiment, the information displayed contains the name or number of the message sender, followed by the message. Actuating the key again will cause the next message to be scrolled across the display, and so on. Once the last message has scrolled, a further actuation of the easy access key results in the phone returning to its idle state.

The procedure for dealing with a missed call or calls is similar to that for dealing with a received message or messages. When a call has been missed the caller details are stored in the phone's memory and the state of the phone changes to a missed call state. In response to this change the processor

causes the display to present text indicating that a call or calls have been missed – e.g. "1 call missed", "2. calls missed" etc. Then, when the easy access key is actuated, the processor retrieves the caller's details from memory and provides them as text scrolling across the display. The callers  
5 details are also be displayed automatically if the cover is opened instead of pressing the easy access key. The details may be displayed in a static or scrolling format as described later for the display of text messages (Figure 17b).

10 Some functionality associated with movement of the cover has already being described such as: answering an incoming call by opening the cover, ending a call in progress by closing the cover and the change in the content of the display when the phone is in the idle mode effected by opening and closing the cover. A further function associated with the active flip is when the phone  
15 is within an item of the menu, closing the flip will return the phone to the idle state. Opening the cover also has functionality in connection with reading received messages.

The process of accessing messages through the menu structure is illustrated  
20 in Figure 17. Selecting Messages 528 from within the Menu 50 by scrolling up or down using the joystick and then pushing the joy stick inwards, displays all the messaging options 171: Inbox which stores received messages , Write which allows the composition of messages, Outbox which stores sent messages, Templates which stores pro-form messages or the like and  
25 Archive in which messages may be stored from the Inbox and Outbox. The icon next to In box contains an arrow indicating it contains a new (unread) message. Selecting the Inbox within the messaging options 171 by scrolling up or down if necessary to highlight "Inbox" and the then pressing the joystick in, displays the contents of the Inbox 172. The contents of the Inbox is a  
30 number of messages. The icon next to Colin indicates that this is an unread

20

message. Selecting the message Colin from within the Inbox 172 by scrolling up or down as necessary using the joystick and then pushing the joystick in, displays the contents of the message 173. Pressing the joystick in again provides a number of options 174 such as erase, edit, archive etc. Selection of the appropriate item by scrolling using the joystick and then pushing the joystick in performs the appropriate function. In the example, erase is selected and the erase function performed. The display then returns to the Inbox 172 if there are any remaining unread messages or to the options 171 if there are not.

10

The format of the message displayed in 173 may take various forms as illustrated in Figure 17b. The message may be static 176, with the user able to scroll up and down through the message by pushing the joystick up or pulling it down. The message may occupy several lines with it scrolling through the display word by word 177. For example, as a word disappears from the screen on the first line at the top left the whole message moves so that the next word is positioned at the top left hand corner of the display and one or more words are appear on the display at the bottom right hand corner. As another alternative 178 the message may occupy a single line and scroll across the screen one character at a time as if the display where a fixed window with the message passing by as if printed on a tape moving at a constant speed past that window.

20

When a message is received while the cover is open, the processor enters a message received state and the Idle display changes to indicate that a message has been received. This is illustrated as 180 in Figure 18. Pushing the joystick inwards enters the Inbox 172. Pushing the joystick to the left, returns the display to the Idle mode. The up, down and right movements of the joystick have the same functions as in this received message state as in the Idle Mode.

30

When a message is received and the cover is closed there are two ways of accessing the message: pressing the easy access key and opening the cover.

- 5 As previously described with reference to Figure 16, when a message has been received with the phone in the closed configuration, and the easy access key (external button) is actuated, the content of the message is scrolled across the display portion as a single line one character at a time in a manner similar to that described in relation to format 178 of Figure 17b. If  
10 the cover is then opened the format of the display changes. This is illustrated in Figure 18b. The text no longer scrolls across the display in a single line, but is preferably displayed in a static format 176 or scrolling format 177 several lines at a time. If the message is displayed in a static format 176, it does not scroll automatically but the contents can be viewed by scrolling through the  
15 message using the joystick. Pushing the joystick upwards scrolls upwards through the message. Pulling the joystick downwards scrolls downwards through the message.

- When a message is received and the cover is closed, the phone enters a  
20 message received state 161 as illustrated in Figure 16. If the cover is then opened, the phone then enters state 73 illustrated in Figure 17a and displays the content of the message received. The format of the content may vary and may be static 176, multiple line and scrolling 177 or single line and scrolling as previously described with reference to Figure 17b. This process is  
25 illustrated in Figure 18c.

The voice dial button 22 allows a user to dial a number using voice commands when the phone is in the Idle state.

Although the user input device 28 has been described with reference to a joystick, the invention is also applicable to other user input devices e.g. a roller or rocker key that is moveable up, down, left, right and inwards.

- 5 The present invention may include any novel feature or combination of features described herein either explicitly or implicitly or any generalisation thereof whether or not it relates to the present claimed invention or mitigates any or all of the problems addressed. In view of the foregoing description it will be evident to a person skilled in the art that various modifications may be
- 10 made within the scope of the invention.

**Communication Device**

- 5 The present invention relates to a radio communications device. In particular, a device operable to providing streaming text through a visible portion of a display when in a closed configuration.

10 Mobile phones now commonly have covers or flips which cover over all or part of a phone's keypad and display. An advantage of covering the keypad but not the display is that the keypad is protected while the display is still visible but a disadvantage is that the display is exposed to damage. An advantage of covering the display and keypad is that the display is protected but a disadvantage is that the display cannot be viewed without opening the cover

15 which cannot be done discretely. Therefore if one receives an SMS message or misses a call one cannot discretely read the message or see who has called.

It would be advantageous to improve this situation.

20 According to one aspect of the present invention there is provided a communications device as claimed in claim 1.

According to various embodiments of the invention there are provided devices

25 as claimed in the dependent claims.

For a better understanding of the present invention and to understand how the same may be brought into effect reference will now be made by way of example to the enclosed drawings in which:

## 2

- Figure 1a is a front perspective view of a phone in a closed configuration;  
Figure 1b is a side perspective view of the phone in a closed configuration;  
Figure 2a is a front perspective view of the phone in an open configuration;  
Figure 2b is a side perspective view of the phone in an open configuration;
- 5 Figure 3 is a schematic illustration of the phone;  
Figure 4 is an illustration of the joystick of the phone;  
Figure 5 illustrates the Menu structure in the phone;  
Figure 6 illustrates a first method of data entry in accordance with the invention;
- 10 Figure 7 illustrates a second method of data entry in accordance with the invention;  
Figure 8 is a front perspective view of the phone in an open configuration;  
Figure 9 illustrates a third method of data entry in accordance with the invention;
- 15 Figure 10 illustrates a fourth method of data entry in accordance with the invention;  
Figure 11 illustrates a method of variable scrolling speed in accordance with the invention;  
Figure 12 is a flow chart illustrating the multiple functionality of an on/off switch of the phone;
- 20 Figure 13 illustrates various idle screens;  
Figures 14 and 15 illustrate the functionality of an easy access button; and  
Figure 16 illustrates various message screens.  
Figure 17a illustrates how message functions can be accessed through the
- 25 Menu 50;  
Figure 17b illustrates various formats that a displayed message or displayed caller details may take;  
Figure 18a illustrates how a message may be read when received with the cover open;

## 3

Figure 18b illustrates how a message may be read when received with the cover closed using the easy access key and then optionally opening the cover;

Figure 18c illustrates how a message may be read when received with the  
5 cover closed without using the easy access button but by opening the cover.

Figures 1 and 2 illustrate a phone 2. The phone has a body portion 4 and a  
cover portion 6 connected by a hinge 5. The cover is movable between a  
closed position as illustrated in Figures 1a (front perspective) and 1b (side  
10 perspective) and an open position as illustrated in Figures 2a (front  
perspective) and 2b (side perspective).

The body portion 4 includes a back face 7 which forms the back of the phone,  
lateral side faces 8a and 8b which form the sides of the phone, an upper side  
15 face 10 which forms the top side of the phone, a lower side face 12 which  
forms the bottom side of the phone, and a front face 14 which is exposed  
when the cover is in the open position and concealed when the cover is in the  
closed position. The body has: an antenna 16 on its upper side face 10; a  
microphone 18 on its lower side face 12; an open-cover button 20, a voice dial  
20 button 22, and an on/off button 24 on its side faces 8; and has a display 26  
and a user input device 28 which is preferably a joystick on its front face 14.  
The buttons are user actuatable. The body also has a hinge switch 30 (not  
shown) which detects the position of the cover, being actuated when the  
cover opens and closes.

25

The cover portion 6 has an exterior surface 32 which is accessible when the  
cover is in the closed position and an interior surface 34 which is inaccessible  
when the cover is in the closed position but is exposed when the cover is in  
the open position. The cover portion has on its exterior surface 32 an easily  
30 accessible button 36 and a speaker 38. The cover portion has on its interior



## 4

surface 34 a speaker 40. The cover also has an aperture 42 extending all the way through the cover. The aperture is positioned and sized so that when the cover is in the closed position only a first portion 26a of the display 26 is visible through the aperture 42 to the user. The aperture may be covered with  
5 a transparent material to allow the user to see the first portion of the display 26a.

When the cover is in the closed position the interior surface 34 of the cover abuts with the front face 14 of the body 4. The cover is arranged and sized to  
10 enclose the input device 28 and display 26 to prevent access by the user. A portion 26a of the display 26 may, however, be viewed by a user through the aperture 36.

When the cover is in the open position the front face 14 of the body and the  
15 interior surface 34 of the cover 6 form an oblique angle of between 135 and 175 degrees. In this configuration the whole of the display 26 is exposed, the user input device 28 is exposed and the microphone 18 on the lower side face 12 of the body 4 and the speaker 40 on the interior surface 34 of the cover 6 are at their maximal separation.

20

The dimensions of the phone in this example are : length 60mm, width 40mm, depth 20mm approx. The display is 2.1 x 1.4 cm (84x48 pixels).

Figure 3 is a schematic illustration of the phone 2. The phone 2 has the  
25 previously described antenna 16, voice dial button 22, on/off button 24, input device (joystick) 28, hinge switch 30, easily accessible button 36, microphone 18, display 26, speakers 40 and 38. In addition the phone has a processor 44, a transceiver 46 and a memory 48. The antenna 16 is connected to the transceiver 46. The transceiver has reception circuitry for receiving radio  
30 frequency signals encoded with data. It processes the received signals as is

known in the art to provide the data in digital form to the processor 50. This data may be a voice message or part of a phone conversation in which case the processor controls the speaker 40 to provide an audible output to the user. Alternatively the data may be part of an alphanumeric message in which case the processor 44 is operable to provide the message on the display. The transceiver has transmission circuitry which is provided with digital data from the processor 44 which may have been input via the microphone 18 or via the input device 28 as alphanumeric characters. The transmission circuitry produces radio frequency signals encoded with that data. The processor is connected to memory 48 to which it can write and from which it can read. The memory 48 typically stores software which controls the functioning of the processor and the phone. In particular the software controls how the processor responds to inputs and what outputs it provides.

15 The processor is connected to the display 26 and to the speakers 40 and 38. It controls the output provided by these devices.

The processor is arranged to receive an input from the microphone 18, the input device (joystick) 28, the hinge switch 30, the on/off button 24, the voice dial button 22 and the easily accessible button 36.

The open cover button 20 is not illustrated in Figure 3 as it opens the cover by mechanical as opposed to electrical action. The natural or low energy configuration for the phone is when the cover is open. The cover is biased to be in the open position. When a user closes the cover they rotate the cover on its hinge against that bias and bring the cover and body into contact. The cover is latched in this closed position. Activating the open cover button releases the latch and the cover springs open.

## 6

The antenna 16, transceiver 46, processor 44, memory 48, display 26, speaker and microphone 18 are standard features of a phone. Previously such features have operated in combination with a keypad to provide the standard functions of a phone including making a call either via a phone book or by direct character entry, receiving a call, creating and sending a message, reading a received message and maintaining a phonebook. However, in the phone 2, the features operate in combination with the joystick 28 to provide these standard functions.

Previously in the NOKIA 6110 telephone the keypad had 12 alphanumeric keys, two soft keys whose function changes and a scroll key. The functions of that phone are accessed through a Menu which is navigated using the soft keys and the scroll key. In the phone 2, the functions of the phone are accessed through a Menu which is navigated using the joystick 28.

Figure 4 illustrates the joystick 28 which can be moved with a user's thumb. The joystick can be pushed forward (towards the display) while simultaneously pushed to the left or right, pushed to the left or right while simultaneously pushed up or pulled back (towards the microphone), and pulled back while simultaneously being pulled left or right. In addition to each of the above movements the joystick may be simultaneously pushed inwards towards the face 14. The joystick 28 has a resting position and it is resiliently biased so that it returns to its resting position when the user has moved it or depressed it and then released it.

The joystick operates in two different modes. The joystick operates by default in "navigation" mode except when it is in "text editing" mode. In navigation mode there are five independent mutually exclusive activation states for the joystick.

The Menu items are the same as those in the NOKIA 6110 except that the joystick is used to navigate the Menu 100 and that due to the absence of an alphanumeric key keypad a new Number Dial item 521 is provided and new alphanumeric character entry methods are provided within each of the items where necessary.

In Idle mode the joystick has several pre-defined modes of operation. Pulling the joystick back causes the Names menu 525 to be displayed. Pressing the joystick inwards results in a shortcut to redial the last number dialled. Pressing the joystick inwards when an alphanumeric message is received causes the phone to display the Message "In Box" to read the message. Pressing the joystick inwards when an incoming call is received causes the incoming call to be answered.

The "text editing" mode of the joystick is active when alphanumeric character entry is required. In this mode the joystick operates in the same manner as an integrated cursor control device in the keyboard of a portable computer in that it controls the position of a cursor or similar selector on the display 26. The joystick can additionally be pressed to accept the selected character(s).

In "text editing" mode, a short press of the joystick to the left results in the deletion of the previous character. A long press to the left (1-2 seconds) causes the deletion of all the text entered so far. In this case the phone subsequently reverts to Idle mode.

A call may be made using the phone via the Names item 525, via Number Dial item 521 or via voice dial.

An incoming call may be answered, when the phone is in the closed configuration, by opening the cover. An incoming call may be answered when

the phone is in the open configuration by pressing the joystick inwards. Closing the cover or by pressing the joystick inwards ends the call. When the cover is open, pushing the joy stick to the left rejects the call. The content of the display is the same when an incoming call is received irrespective of  
5 whether the cover is open or closed.

Turning now to the menu structure as shown in Figure 5, further details of the menu structure will be described with reference to Figure 6.

10 A mixed menu of characters and operands for functions of the phone(e.g. to make a call) is used. In this case, the joystick is used to navigate to the Number Dial menu which is then selected by pushing the joystick inwards. A menu is displayed on the display and a user selects the numerical characters by pushing forward and pulling back the joystick as appropriate. Once the  
15 number input is complete, the user selects the Call operand item from the menu and the call is established.

Figure 6 shows the display 26 displaying the "Number Dial" menu item 521. In figure 6 a left arrow indicates that the joystick is pushed to the left, a right  
20 arrow indicates that the joystick is pushed to the right, an up arrow indicates that the joystick is pushed forward, a down arrow indicates that the joystick is pulled back and the symbol • indicates that the joystick is pushed inwards. A user selects the Number Dial option by pushing the joystick inwards (602) as described previously.

25

The display then changes to a text input mode with a menu 60 on the right-hand side of the display. The items of the menu 60 comprise both alphanumeric characters and operands, e.g. Call, OK, Name, Add etc. These operands can be represented textually or graphically as shown in Figure 6.  
30 The icon 66 of a phone indicates the call operand. Thus a user can access

the required functionality of the phone without having to move to a separate menu to carry out an action.

To select from the menu 60, a user scrolls through the menu (604) by pushing  
5 the joystick forward (if movement up the menu is required) or pulling the  
joystick back (if movement down the menu is required). Each item in the  
menu 60 is highlighted at the bottom right-hand corner of the display as the  
menu is scrolled. When the required alphanumeric character is highlighted,  
the user selects the character (606) by pushing the joystick inwards. The  
10 selected character 62 is then displayed on the left-hand side of the display 26,  
adjacent the menu 60. This action is repeated (608) until the text input is  
completed.

When the user has finished inputting the number, the user selects the phone  
15 icon 66 from the menu 60 by pushing the joystick inwards (610). The display  
26 then changes (612) to indicate that this operand is being performed and  
the device proceeds to try to establish the call.

As described previously, pushing the joystick to the right at any time (614)  
causes the display of options available to the user at that time and pushing  
20 the joystick to the left at any time (616) causes the current menu to be exited.

Figure 7 shows the menus available when the Name menu 525 is selected.  
The user is presented with the "Add Name" option 72 and inputs a name  
using the alphanumeric characters in the menu 70. Again the items of the  
25 menu 70 comprise both alphanumeric characters and operands, e.g. OK,  
Caps (for capital letters), Insert, Exit etc. Once the name has been input, the  
user then selects from the menu 70 the required operand e.g. OK. When this  
operand is selected (702) the user is presented with the "Add Number" option  
74 and a menu 76 of operands and numeric characters. Once the number to  
30 be associated with the name has been entered, the user selects the required

operand from the menu 76 e.g. OK and the name and number are stored (704) in the memory 48 of the phone as a phone book entry. Suitable operands are OK, Insert and Cancel.

- 5 Alternatively the menus 60, 70, 76 may be provided at the bottom of the display in a horizontal manner. The menu items may be displayed a line at a time with an up/down movement of the joystick resulting in the display of successive lines of menu items and a left/right movement of the joystick resulting in the highlighting of successive items in the line of the menu 60.

10

The joystick may also be used to input data directly, without the requirement for a menu of options to be displayed on the screen. For instance, the input device 28 may be used to input numeric characters. Figure 8 shows an example of such a joystick. In Figure 8, feedback to the user about the

15 characters available is provided around the joystick, on the front face 14 of the body 4. Alternatively this feedback may be provided on the display 26.

- In this mode, a user is prompted to use the joystick to input numbers, for instance by an image 90 on the display 26 (see Figure 9). If the user pushes
- 20 the joystick forward the numbers 1, 2 or 3 may be selected; if the user pushes the joystick to the right the numbers 4, 5 or 6 may be selected; if the user pulls the joystick back the numbers 7, 8 or 9 may be selected; if the user pushes the joystick to the left the number 0 and the characters \* and # may be selected. Pushing the joystick repeatedly in one direction causes the
- 25 characters available to be scrolled through; a character may be selected either if a pre-determined time has elapsed without any further input from a user or by the user pushing the joystick inwards (902) for a short time.

- Once the user has input the number by successively pushing/pulling the
- 30 joystick and then pushing the joystick inwards (904-908), the user pushes the

20 A further method of data input will now be described with reference to Figure 10. A user scrolls through a list of characters 100 in blocks of three 102 by pushing the joystick forward or pulling the joystick back. The user selects a character by then pushing the joystick to the right (104) until the required character is highlighted and then pushing the joystick inwards (105) for a short  
25 time. When the user has inputted the entire item, the user pushes the joystick inwards (106) for a relatively long time. A menu 108 of actions is then displayed and the user selects the appropriate one by pushing the joystick inwards.



According to a further aspect of the invention, the speed of scrolling is determined by the position of the joystick as illustrated in Figure 11. A selectable item is highlighted as the items in a menu are scrolled through. A single movement of the joystick up or down (110) causes a display (menu or text) to be scrolled through by one line at a time. Thus in Figure 11 the highlighted item will change from Bruce to Carl. Pushing the joystick inwards (111) selects this item.

Moving the joystick up or down and holding it in this position (112) causes the item to be scrolled through continuously e.g. the names Bruce, Carl, Diana, Fiona, ... Graham, Guy will be scrolled through in a continuous manner until the joystick is released. Pushing the joystick inwards (111) selects the highlighted item.

Moving the joystick up or down and holding it in this position whilst also pressing in on the joystick (113) results in a higher speed of continuous scrolling. Thus the display changes from Graham, Guy, Helen to further down the menu (e.g. Susa, Tom, Trevor) faster than previously. Thus a user can quickly scroll through a long list until the general region of the required item is located and then release the inward pressure on the joystick to cause the speed of scrolling to reduce. The joystick can then be held in the up (or down) position until the required item is located. The joystick is released and pushing the joystick inwards (111) then selects the highlighted item.

The hinge switch 30 is activated when the cover 6 is opened and is activated when the cover is closed. The switch detects when the interior surface 34 of the cover 6 makes a specific acute angle (for example 5 degrees) with the front face 14 of the body 4. The processor maintains a register which changes state when the hinge switch is activated. The processor is therefore aware of whether the cover is in the open or closed position. The processor also

detects via the hinge switch 30 when the cover is opened and when the cover is closed.

Turning now to the on/off button 24 of the phone, illustrated in Figure 3, this button has multiple functionality. In this embodiment, the functionality is determined by the manner of actuation of the button 24 and/or the state of the phone. Figure 12 illustrates how the processor 50 determines which function to perform when the on/off button is actuated.

10 The processor waits for actuation of the on/off button 24 by the user (Step 120). When the button is actuated, the processor 50 proceeds to Step 121. In this case, the processor 50 responds differently when the button is depressed and released (short press) compared with when the button is held in a depressed position and then released (long press). The processor  
15 senses the input from the button. When the button is activated the processor starts a timer. When the button is deactivated the processor stops the timer. If the count of the timer is less than a predetermined threshold the processor determines that the user employed a short press and wishes to access a function or function associated with that method. Consequently, the  
20 processor moves to step 122.

Alternatively, if the count of the timer is equal to or more than a predetermined threshold (typically 1-2 seconds) the processor determines that the user employed a long press (Step 125). In this case, a long press is indicative of a  
25 power off function, and consequently, the processor performs this function in a conventional manner.

Turning back now to Step 122, the short press is not indicative of a single function. Instead, the function depends upon the state of the phone. If not in  
30 Idle mode 54 then the processor exits all menus and returns the phone to Idle

15

mode 54 (Step 124). On the other hand, if the phone is already in Idle mode 54 then the processor performs a shortcut into the profiles menu (Step 123) which may also be entered via item 124. When in the Idle mode the on/off button has the same functionality as that in the NOKIA 6110 in the Idle mode.

5

The voice dial button 22 allows a user to dial a number using voice commands when the phone is in the Idle state.

10

In this embodiment, the display contains different information when in the idle state, depending on the circumstances of the phone. Figure 13 illustrates different examples: Figure 13 (a) shows different information presented on the display depending on whether the cover is in the open or closed position, and Figure 13(b) shows alternative idle screens when the cover is in the closed position a headset is coupled to the phone.

15

Figure 13(a) illustrates the idle screen as it appears on a visible area 131 of the display and on the whole display 132, when the cover is in the closed position. It also illustrates the screen as it appears on the display when the cover is in its open position.

20

As can be seen, when the cover is in the closed position, the content of the idle screen is reduced from that apparent when the cover is in its open position, to key information such as network signal strength, battery and time and this information is centred in the display. The format as opposed to the content is also changed. In the closed position the battery and signal indicators are of a rounded design extending towards the centre of the display, whereas in the open position they are of a linear design. The content of the screen is therefore more centred, simpler, clearer and contains less information when the cover is closed compared to when it is open.

30

Figure 13(b) illustrates idle screens 134 and 135 as they appear on a visible area of the display when a headset is coupled to the phone. In this case, for an initial period, a first idle screen 134 is presented, that comprises the word "Headset" and icon of a headset. After this period, the processor controls the display to present a second idle screen 135 in which the word "Headset" is replaced with the time.

Idle mode screen may depend upon the placement or use of the product. For example, if the phone is a wrist-worn device its idle screen may have prominent watch functions such as time zones, alarms or analogue looking clock faces. Similarly, personalisable wearable products may have user defined bitmaps.

Easy access button 36 has multiple functionality when the phone is in the closed configuration and no function, it is disabled, when the cover is opened. In this context, multiple functionality does not mean that the button has multiple functions simultaneously, it does not. At any time, the button 36 has only a single function. However, that single function may be one of many depending upon the state of the phone. Generally, actuation of the button provides the most likely response to a given situation. It does not delete or change things. If the alarm rings, activation ends the ringing. If there is an incoming call activation mutes the ringing. If a message has just been received activation opens the message. If a call has just been missed activation gives the caller's details. If the phone is in the Idle state, activation redials the last dialled number.

Figures 14 and 15 illustrate how the processor 50 determines which function to perform when the easy access button 36 is actuated.

Firstly, the processor 50 determines whether the phone's cover is in its closed position (Step 141). If it is, the processor waits for actuation of the easy access key by the user (Step 142). However, if the phone is in its open configuration, then the processor disables the easy access key (Step 144).

5 This disablement may be complete or partial disablement of the phone. Complete disablement may, for example include the processor not responding at all to key actuation, so that even display backlighting, audible indications and the like, which generally occur upon key actuation, are not performed. Partial disablement, on the other hand, may merely be disablement of the

10 actual function or functions associated with the key.

If the processor detects actuation of the easy access key, the processor proceeds from Step 142 to Step 143. Step 143 includes the determination by the processor of the state of the phone and the performance of the

15 consequential function. This is further explained with reference to Figure 15.

In this embodiment, the easy access key has a plurality of functions, depending upon the phone being in one of five states when the key is actuated. These five states are incoming call, alarm, headset attached, idle

20 and message received, as explained briefly above.

If the processor 50 determines that, when the key is actuated, the phone is either in the incoming call state (decision 151) or the alarm state (decision 152), then the processor disables the audible indicator or speaker 38 (Step

25 156). Alternatively, if the processor 50 determines that, when the key is actuated, a headset is attached to the device (decision 153) or the phone is in the idle state (decision 151), then the processor accesses the last number redial menu. It also displays the last number redial option on the display 26.

## 18

The processor causes the received message to be displayed (Step 158) if the phone is in the message received state (decision 155) when the easy access key is actuated. Next, the processor determines whether the message displayed is the only one received. (Step 159). If it is, then once the message has been fully displayed, the processor returns the phone to its idle state (Step 146). However, if there is a further message, the processor waits for a further actuation of the easy access key (Step 145). ). If the key is not actuated within a predetermined period, then the processor returns the phone to its idle state (Step 146). However, on the other hand, if the key is actuated within the predetermined period, then the further message is displayed (Step 158). Steps 158, 159 and 145 are repeated until all messages have been displayed or the easy access key is not actuated within the predetermined period.

Figure 16 illustrates two message screens, as viewed when the cover is in its closed position. When a message is received, the state of the phone changes to the message received state. In response to this change, the processor causes the display to present the content as illustrated by the view 161. Then, once the easy access key (external button) is actuated, the message starts scrolling across the display, as illustrated by the view 162. In this embodiment, the information displayed contains the name or number of the message sender, followed by the message. Actuating the key again will cause the next message to be scrolled across the display, and so on. Once the last message has scrolled, a further actuation of the easy access key results in the phone returning to its idle state.

The procedure for dealing with a missed call or calls is similar to that for dealing with a received message or messages. When a call has been missed the caller details are stored in the phone's memory and the state of the phone changes to a missed call state. In response to this change the processor

causes the display to present text indicating that a call or calls have been missed – e.g. “1 call missed”, “2. calls missed” etc. Then, when the easy access key is actuated, the processor retrieves the caller’s details from memory and provides them as text scrolling across the display. The callers  
5 details are also be displayed automatically if the cover is opened instead of pressing the easy access key. The details may be displayed in a static or scrolling format as described later for the display of text messages (Figure 17b).

10 Some functionality associated with movement of the cover has already being described such as: answering an incoming call by opening the cover, ending a call in progress by closing the cover and the change in the content of the display when the phone is in the idle mode effected by opening and closing the cover. A further function associated with the active flip is when the phone  
15 is within an item of the menu, closing the flip will return the phone to the idle state. Opening the cover also has functionality in connection with reading received messages.

The process of accessing messages through the menu structure is illustrated  
20 in Figure 17. Selecting Messages 528 from within the Menu 50 by scrolling up or down using the joystick and then pushing the joy stick inwards, displays all the messaging options 171: Inbox which stores received messages , Write which allows the composition of messages, Outbox which stores sent messages, Templates which stores pro-form messages or the like and  
25 Archive in which messages may be stored from the Inbox and Outbox. The icon next to In box contains an arrow indicating it contains a new (unread) message. Selecting the Inbox within the messaging options 171 by scrolling up or down if necessary to highlight “Inbox” and the then pressing the joystick in, displays the contents of the Inbox 172. The contents of the Inbox is a  
30 number of messages. The icon next to Colin indicates that this is an unread

message. Selecting the message Colin from within the Inbox 172 by scrolling up or down as necessary using the joystick and then pushing the joystick in, displays the contents of the message 173. Pressing the joystick in again provides a number of options 174 such as erase, edit, archive etc. Selection  
5 of the appropriate item by scrolling using the joystick and then pushing the joystick in performs the appropriate function. In the example, erase is selected and the erase function performed. The display then returns to the Inbox 172 if there are any remaining unread messages or to the options 171 if there are not.

10

The format of the message displayed in 173 may take various forms as illustrated in Figure 17b. The message may be static 176, with the user able to scroll up and down through the message by pushing the joystick up or pulling it down. The message may occupy several lines with it scrolling  
15 through the display word by word 177. For example, as a word disappears from the screen on the first line at the top left the whole message moves so that the next word is positioned at the top left hand corner of the display and one or more words are appear on the display at the bottom right hand corner. As another alternative 178 the message may occupy a single line and scroll  
20 across the screen one character at a time as if the display where a fixed window with the message passing by as if printed on a tape moving at a constant speed past that window.

When a message is received while the cover is open, the processor enters a  
25 message received state and the Idle display changes to indicate that a message has been received. This is illustrated as 180 in Figure 18. Pushing the joystick inwards enters the Inbox 172. Pushing the joystick to the left, returns the display to the Idle mode. The up, down and right movements of the joystick have the same functions as in this received message state as in  
30 the Idle Mode.



When a message is received and the cover is closed there are two ways of accessing the message: pressing the easy access key and opening the cover.

- 5 As previously described with reference to Figure 16, when a message has been received with the phone in the closed configuration, and the easy access key (external button) is actuated, the content of the message is scrolled across the display portion as a single line one character at a time in a manner similar to that described in relation to format 178 of Figure 17b. If
- 10 the cover is then opened the format of the display changes. This is illustrated in Figure 18b. The text no longer scrolls across the display in a single line, but is preferably displayed in a static format 176 or scrolling format 177 several lines at a time. If the message is displayed in a static format 176, it does not scroll automatically but the contents can be viewed by scrolling through the
- 15 message using the joystick. Pushing the joy stick upwards scrolls upwards through the message. Pulling the joystick downwards scrolls downwards through the message.

- When a message is received and the cover is closed, the phone enters a
- 20 message received state 161 as illustrated in Figure 16. If the cover is then opened, the phone then enters state 73 illustrated in Figure 17a and displays the content of the message received. The format of the content may vary and may be static 176, multiple line and scrolling 177 or single line and scrolling as previously described with reference to Figure 17b. This process is
- 25 illustrated in Figure 18c.

The voice dial button 22 allows a user to dial a number using voice commands when the phone is in the Idle state.

## 22

Although the user input device 28 has been described with reference to a joystick, the invention is also applicable to other user input devices e.g. a roller or rocker key that is moveable up, down, left, right and inwards.

- 5 The present invention may include any novel feature or combination of features described herein either explicitly or implicitly or any generalisation thereof whether or not it relates to the present claimed invention or mitigates any or all of the problems addressed. In view of the foregoing description it will be evident to a person skilled in the art that various modifications may be
- 10 made within the scope of the invention.

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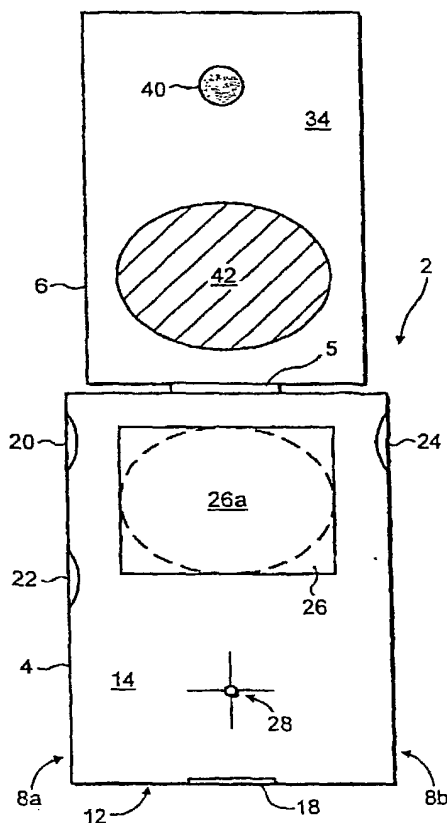
PCT

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[Continued on next page]

(54) Title: COMMUNICATION DEVICE



(57) Abstract: A communications device comprising a body and an attached cover having an aperture, wherein the device has a closed configuration in which portions of the body are covered and an open configuration in which at least some of the portions covered in the closed configuration are uncovered, the body comprising receiver means for receiving data via radio transmissions; a display operative independent of whether the cover is in the closed or open configuration and positioned such that in the open configuration the display is uncovered and positioned such that in the closed configuration the aperture is substantially aligned with the display so that at least a portion of the display is visible to a user through the aperture; and a processor arranged to control the display and operable to show received data as text, wherein when the device is in the closed configuration the processor is operable to provide the received text to the user as text which streams through said visible portion of the display.

WO 01/28191 A1

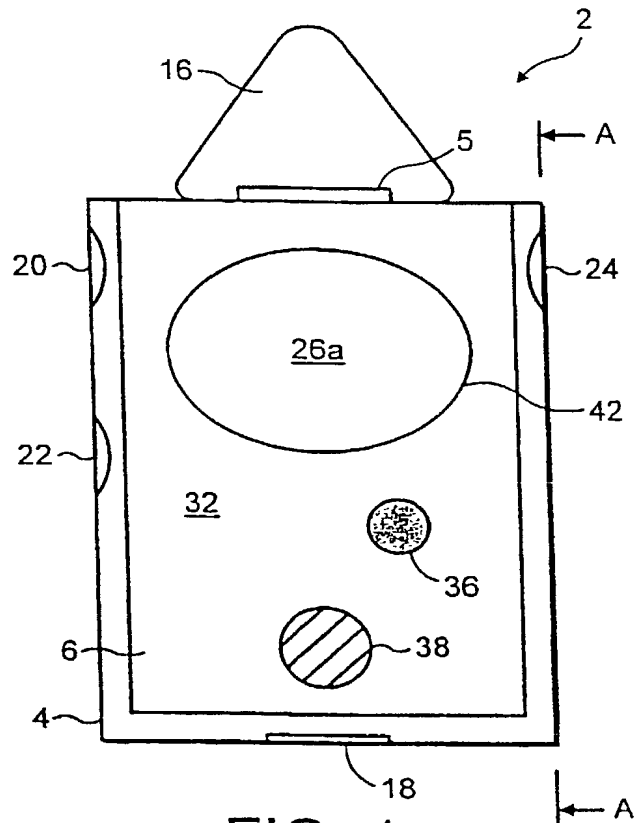


FIG. 1a

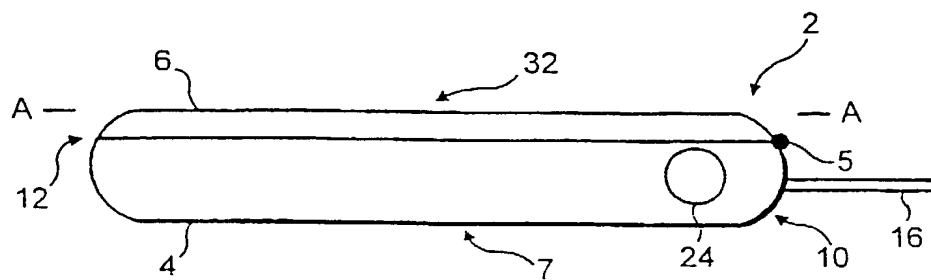


FIG. 1b

2 / 17

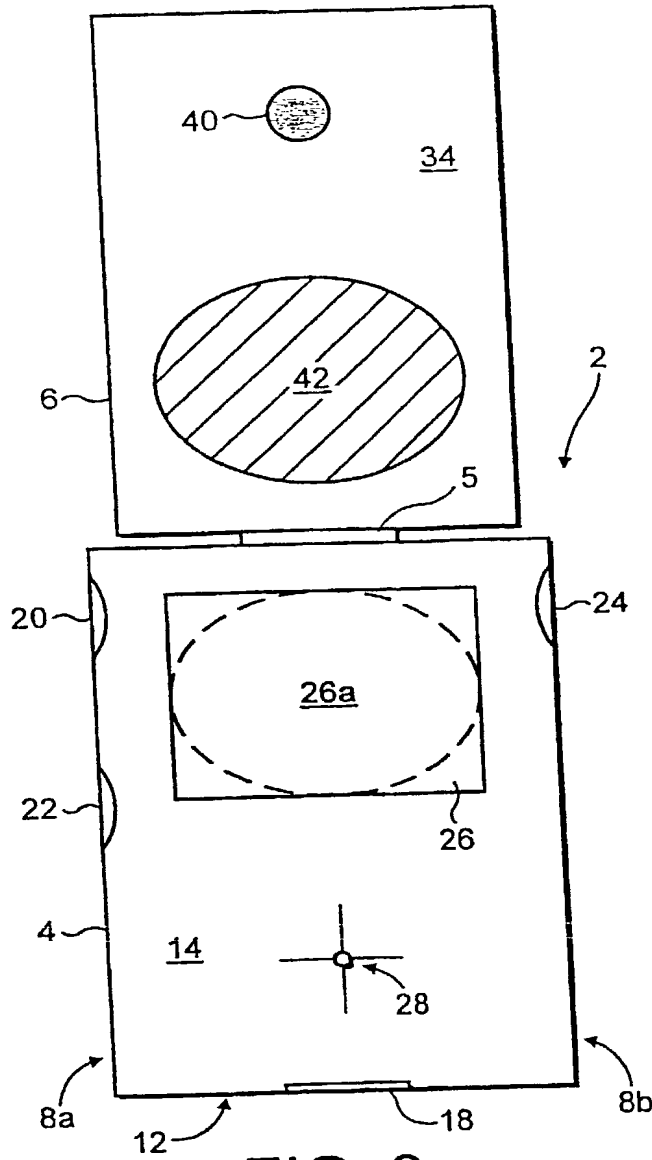


FIG. 2a

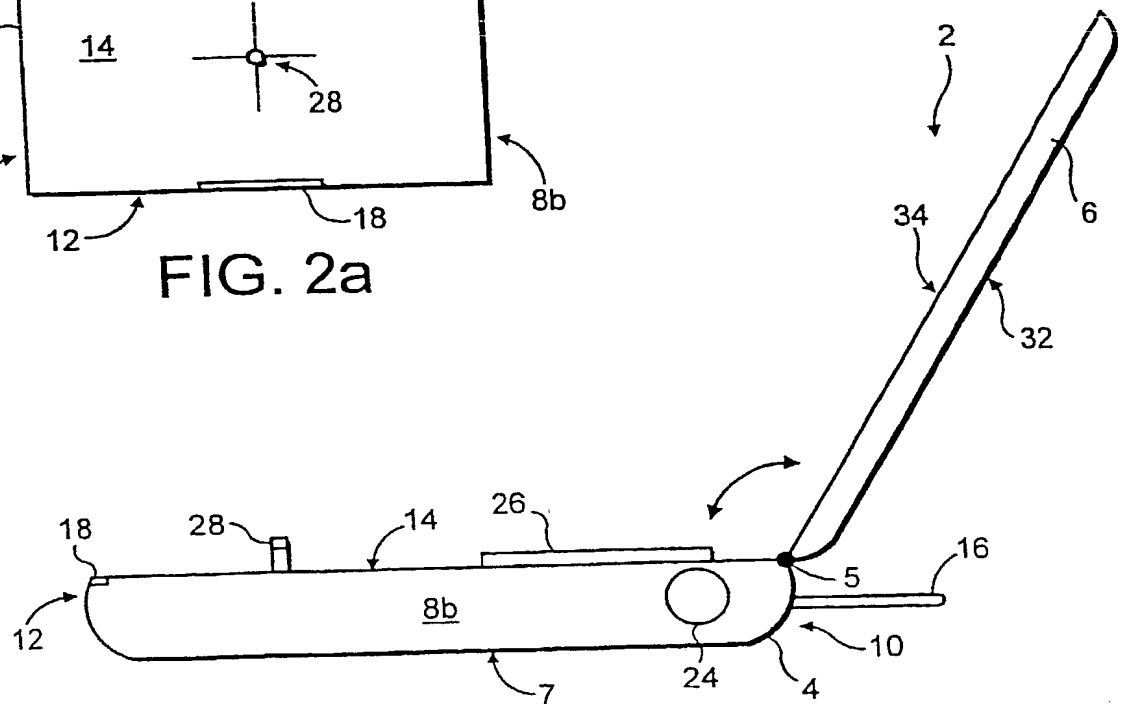


FIG. 2b

3 / 17

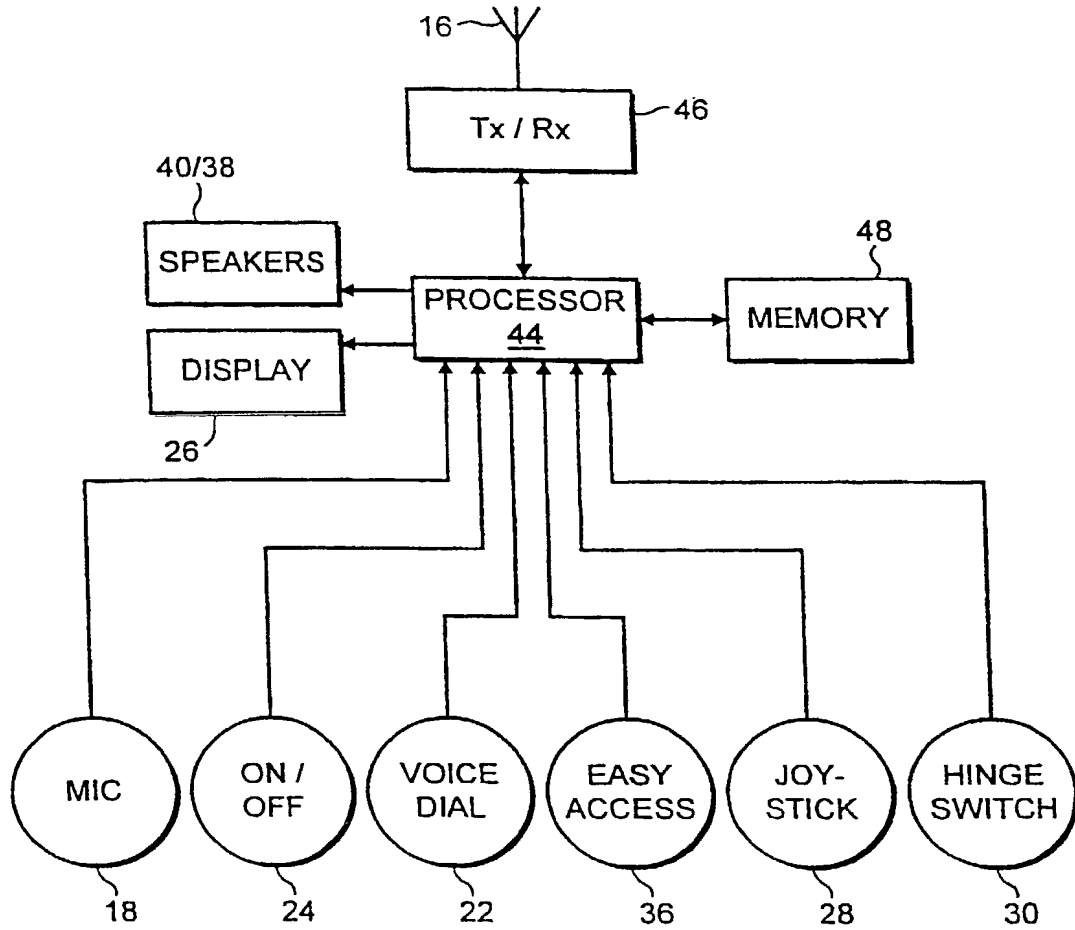


FIG. 3

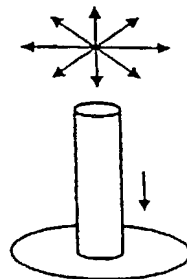


FIG. 4

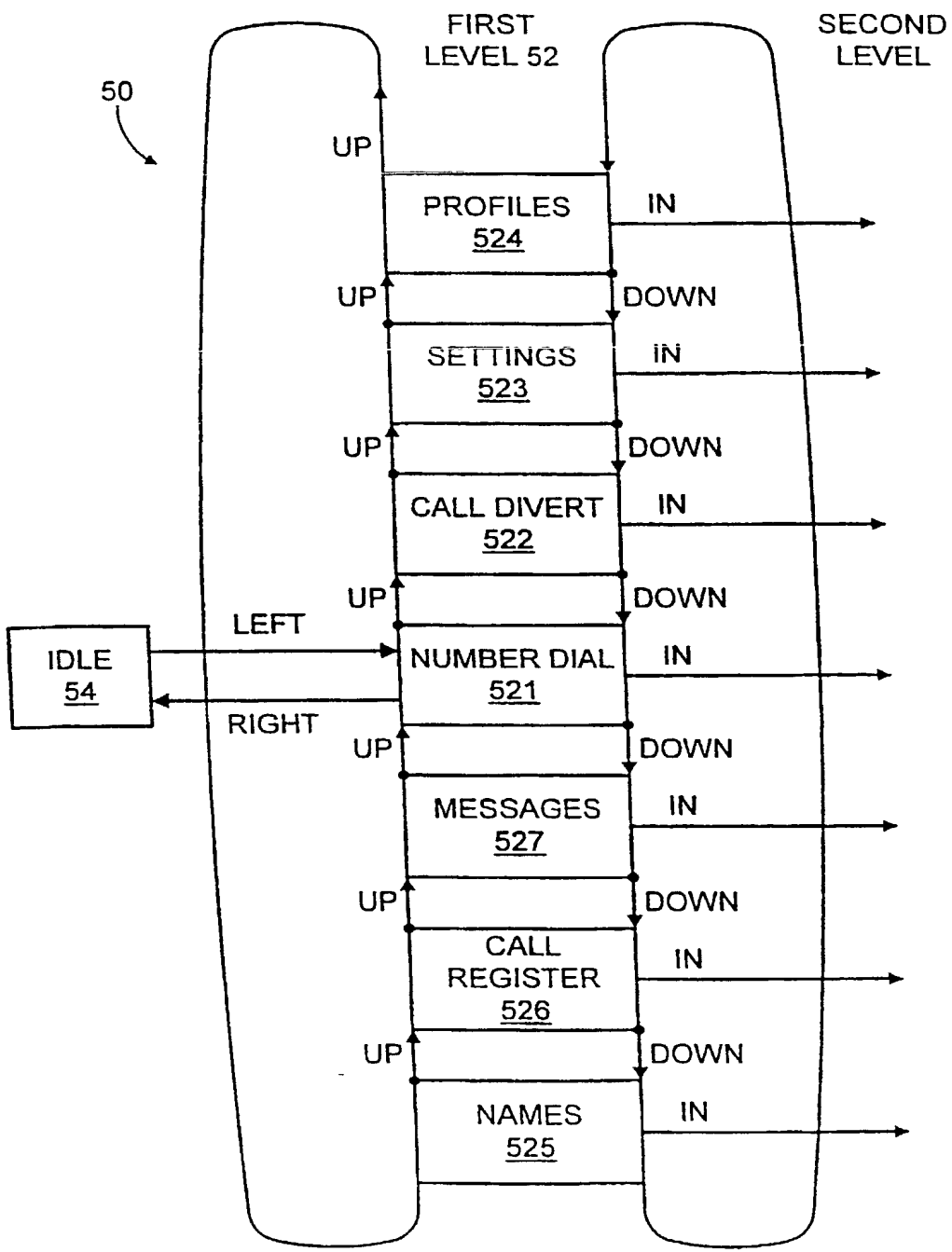
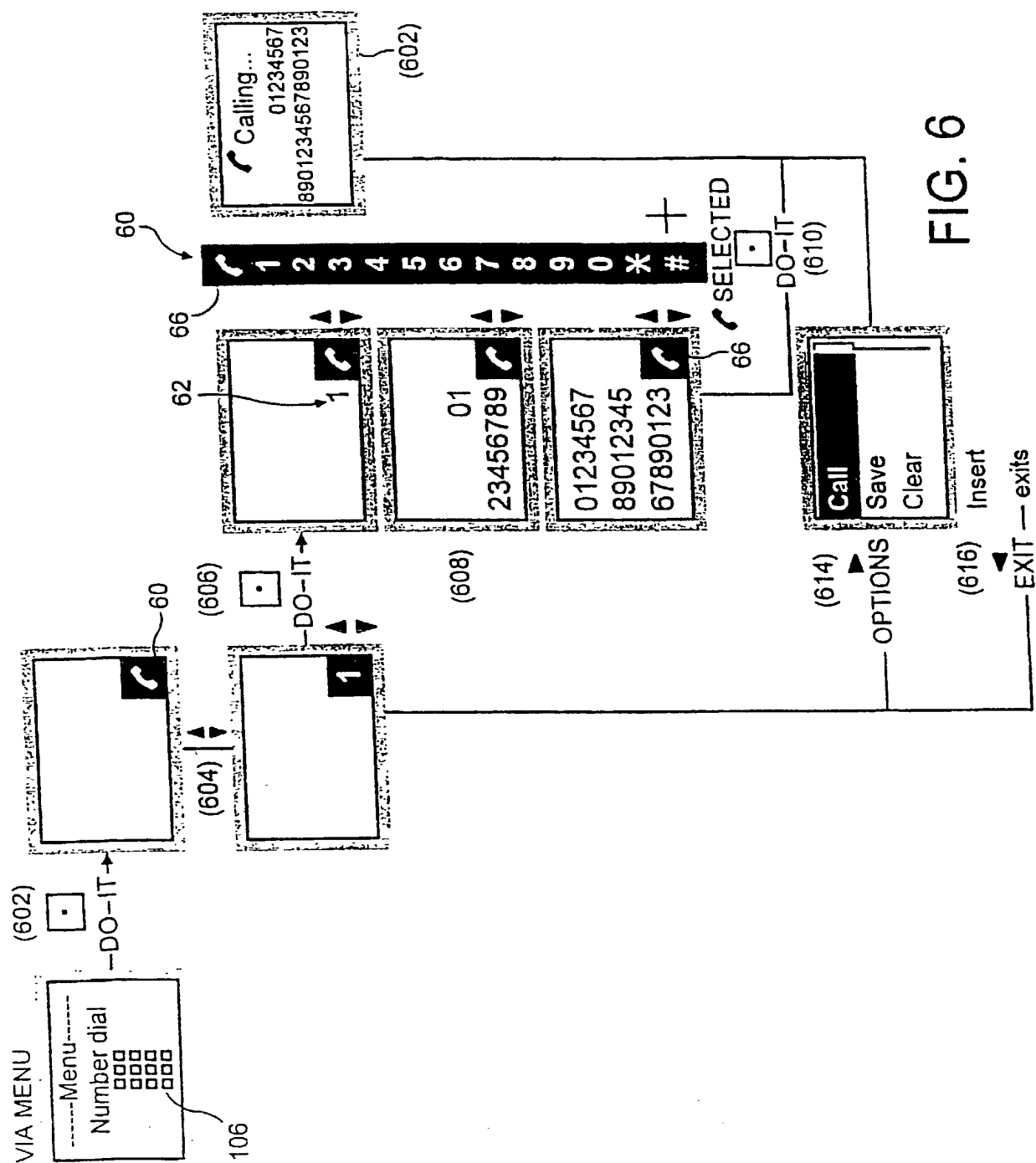
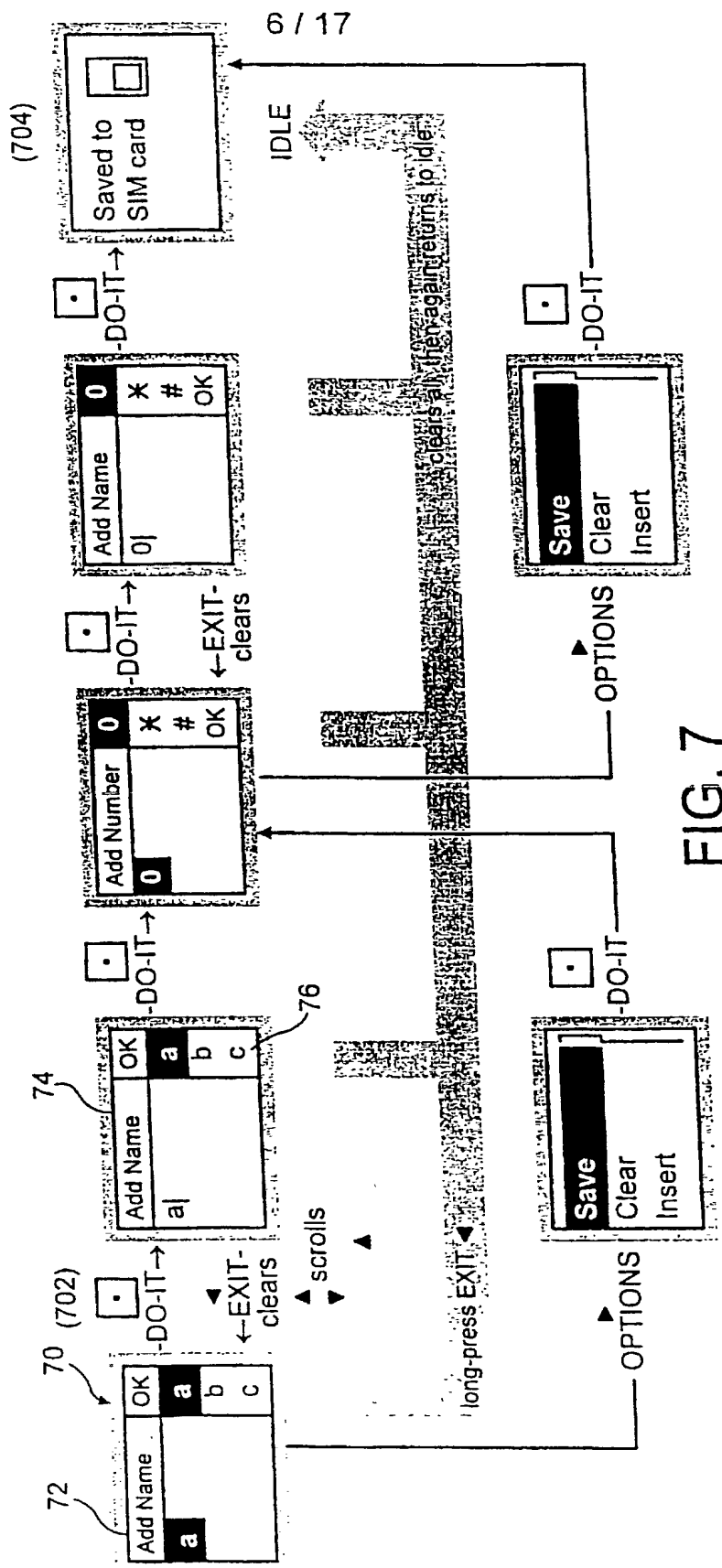


FIG. 5







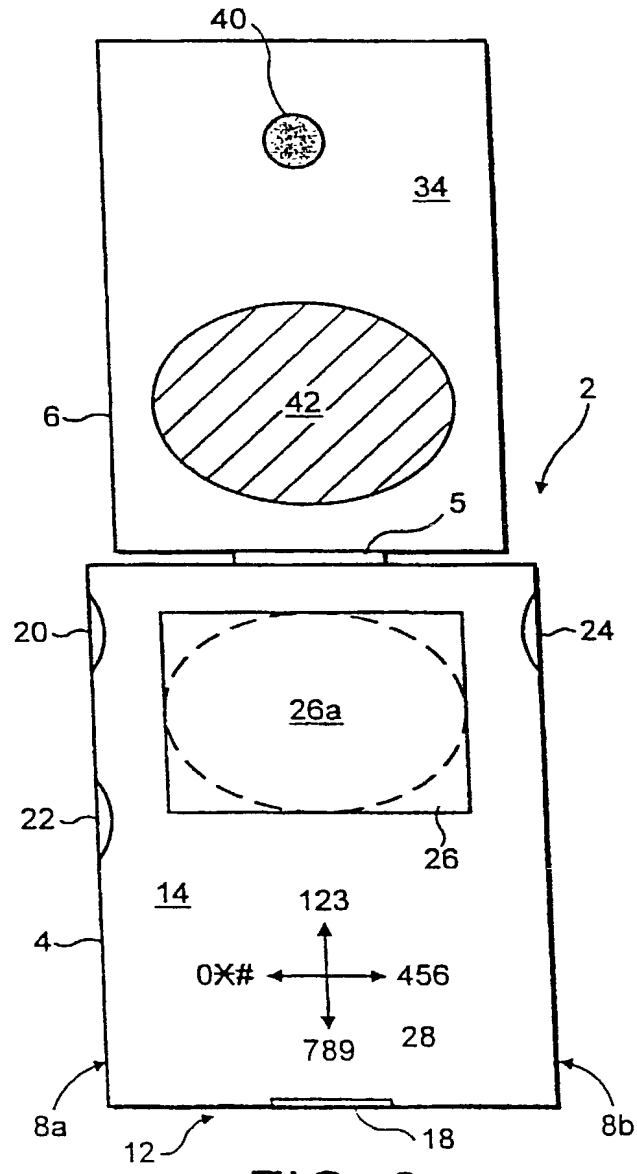


FIG. 8

[illegible]

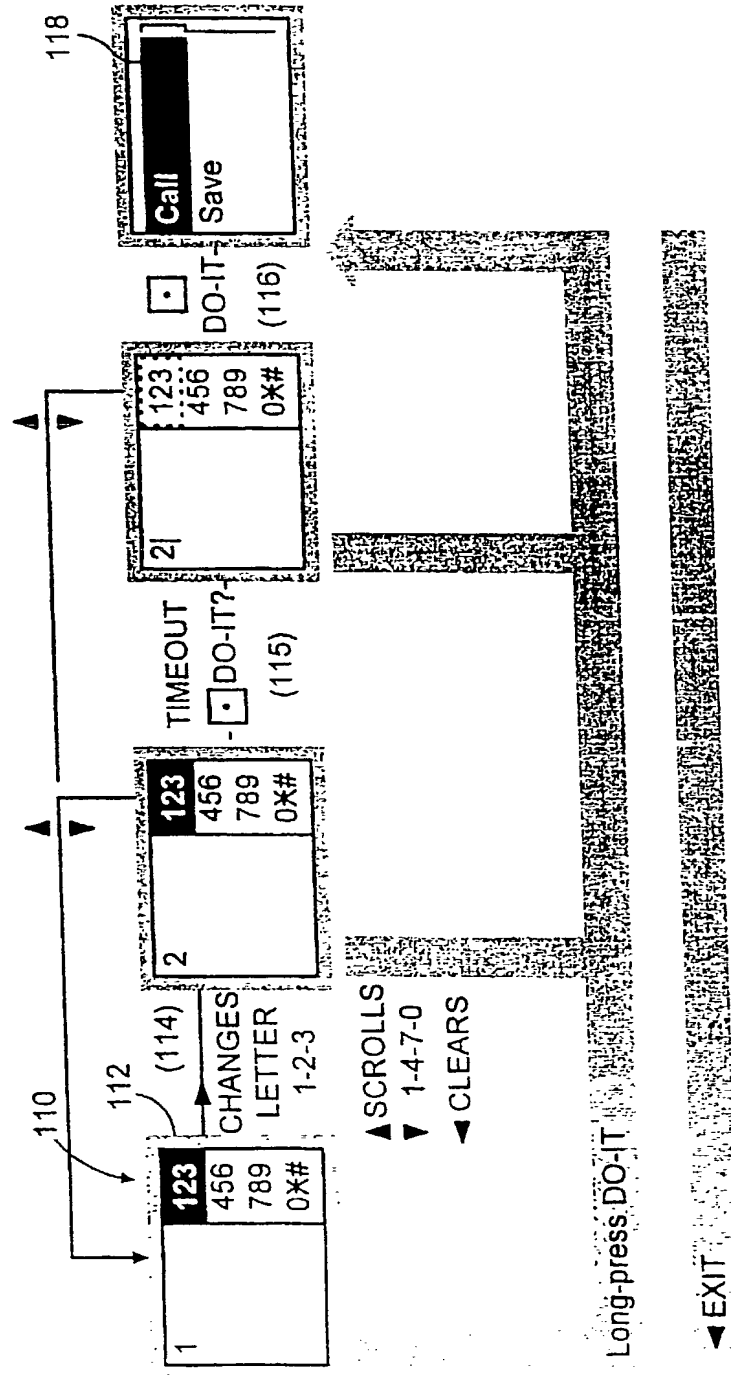


FIG. 10

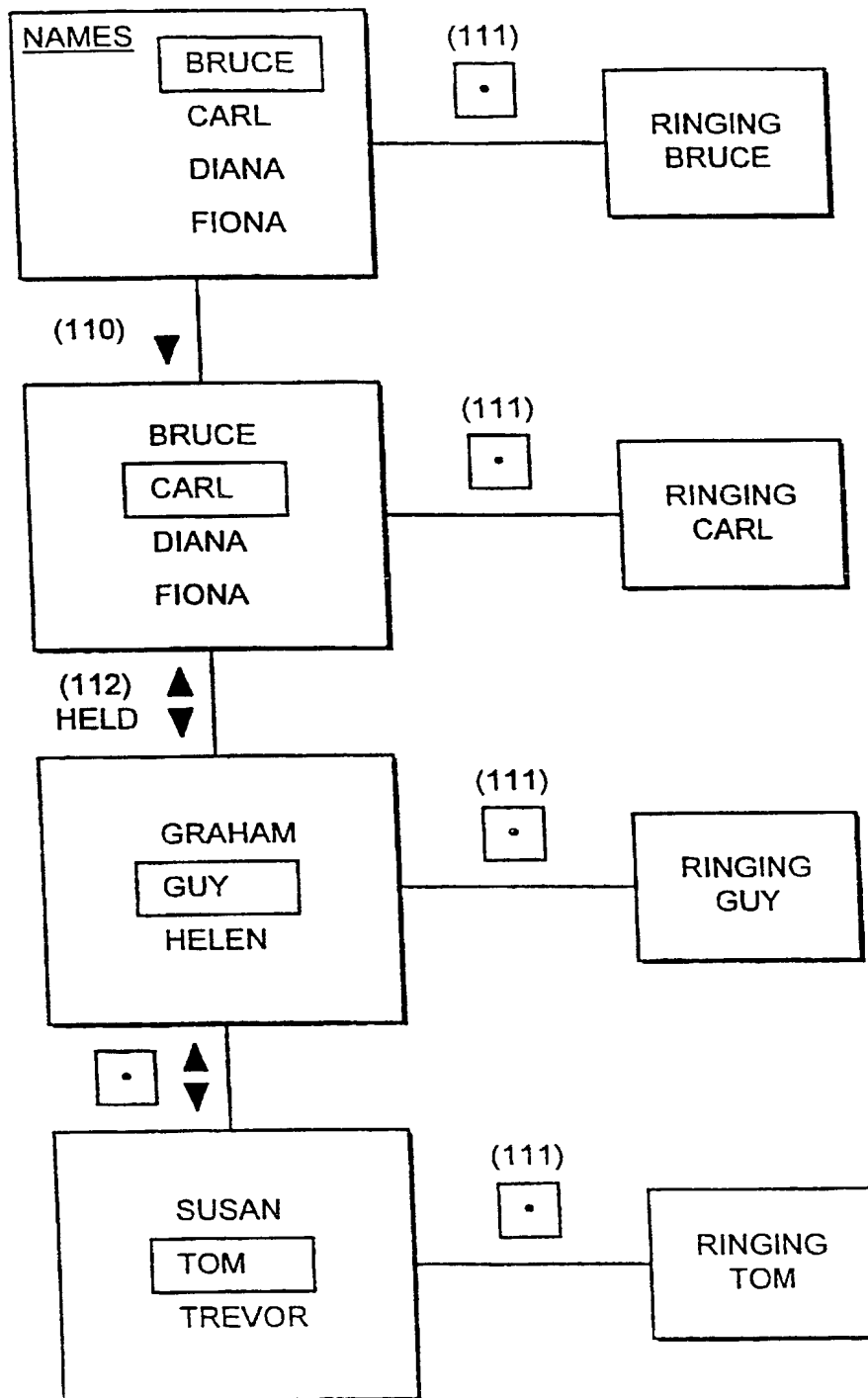


FIG. 11

FIG. 12

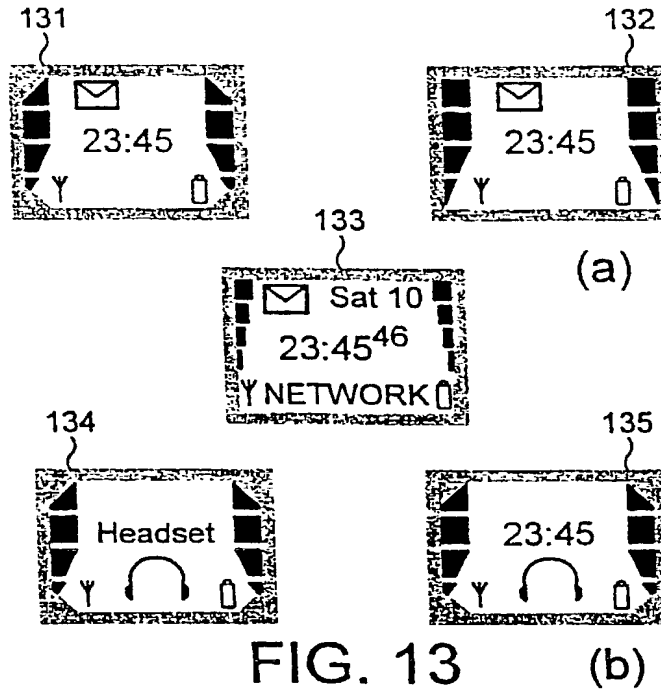


FIG. 13

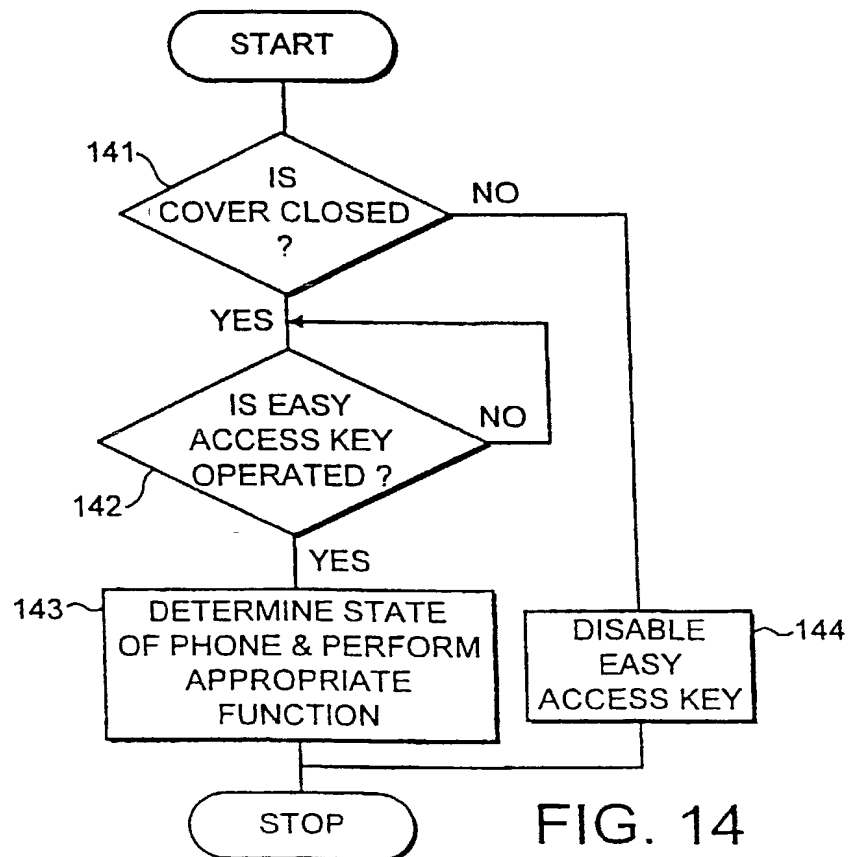


FIG. 14

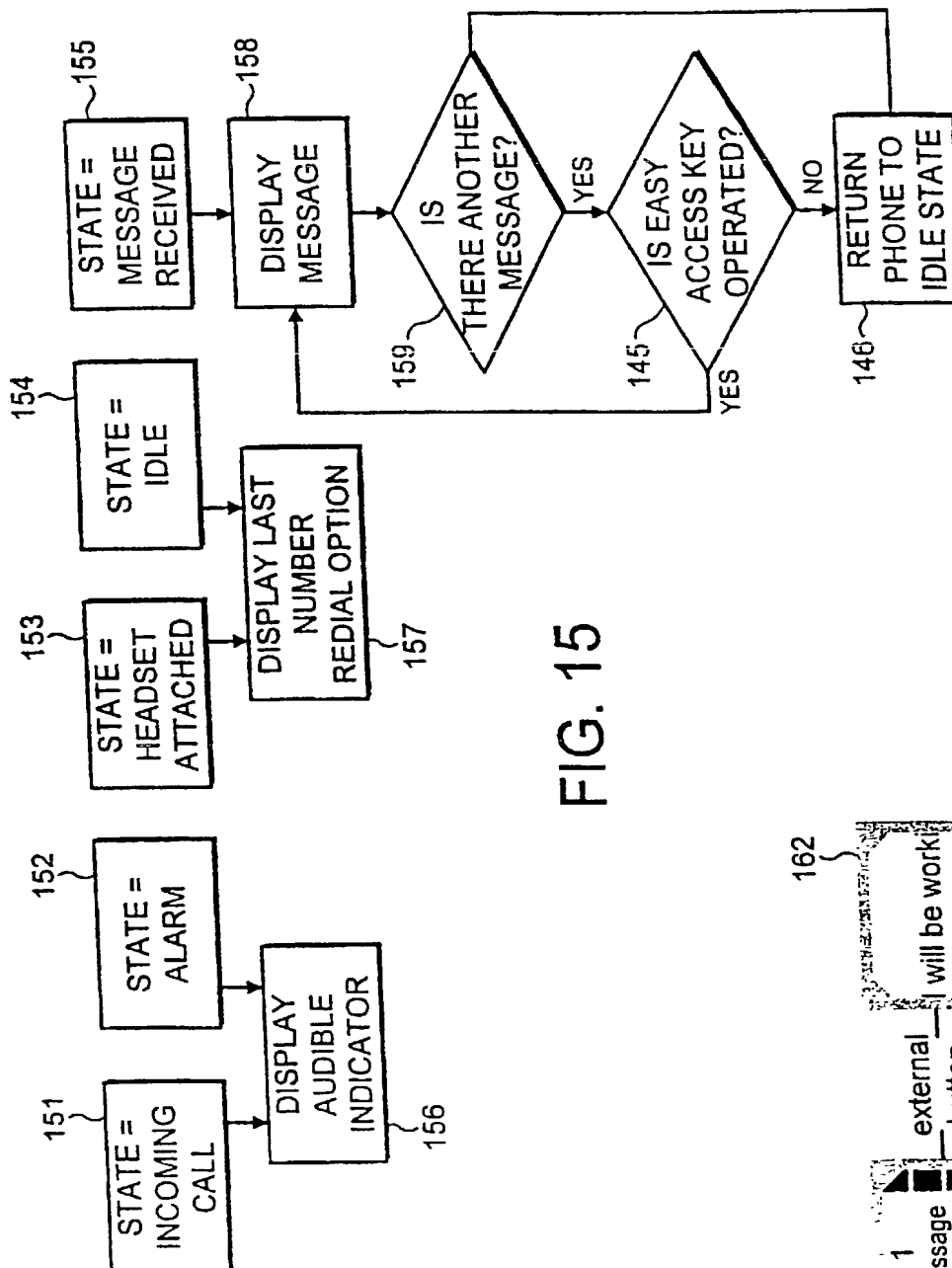


FIG. 15

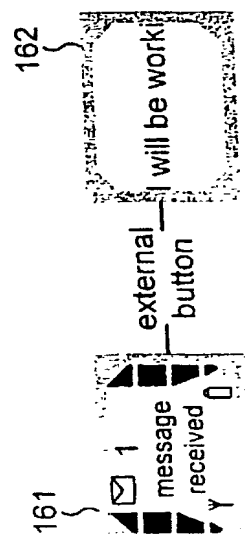


FIG. 16



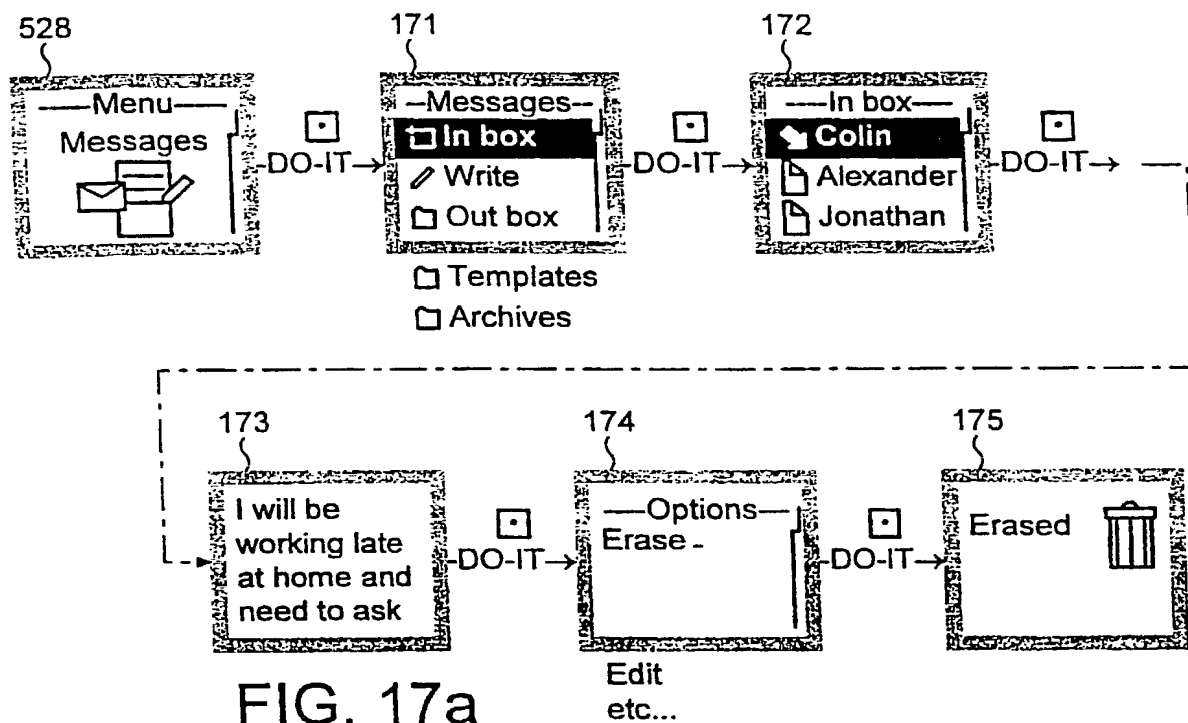


FIG. 17a

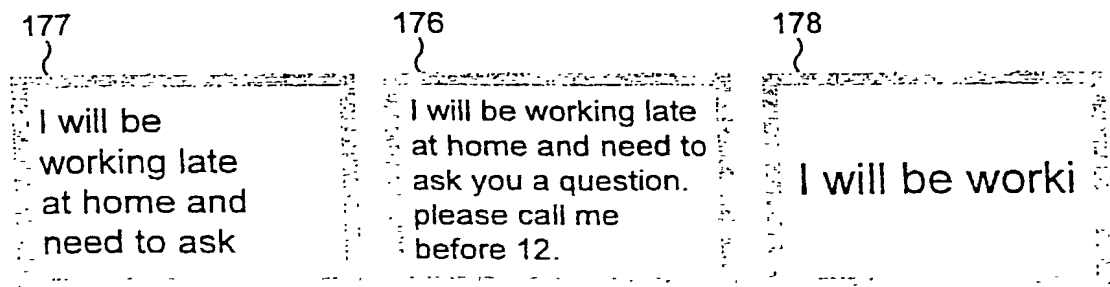


FIG. 17b

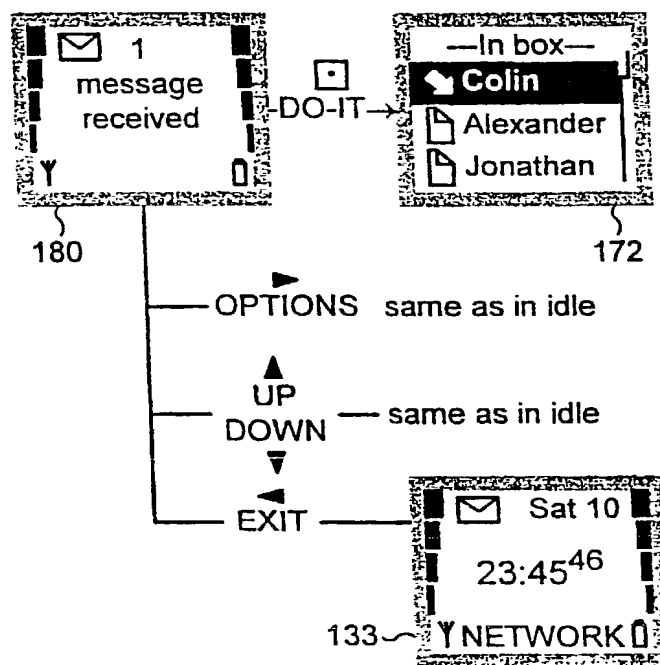
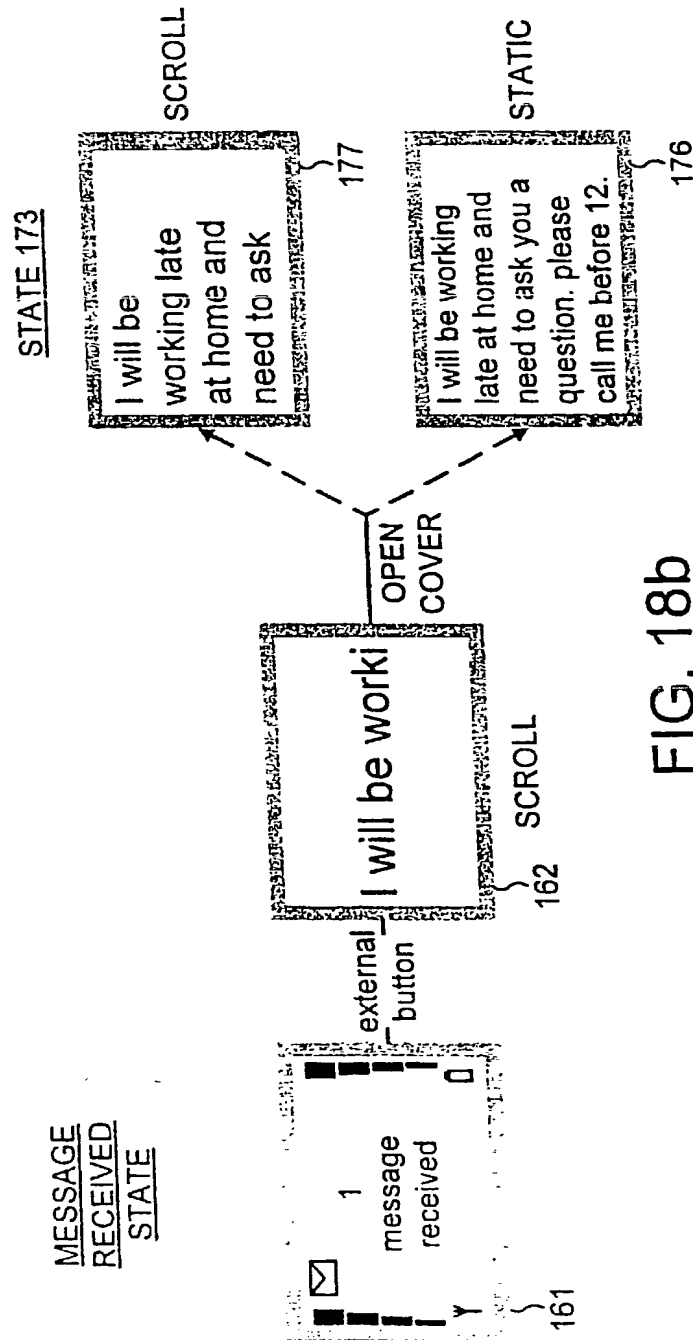


FIG. 18a



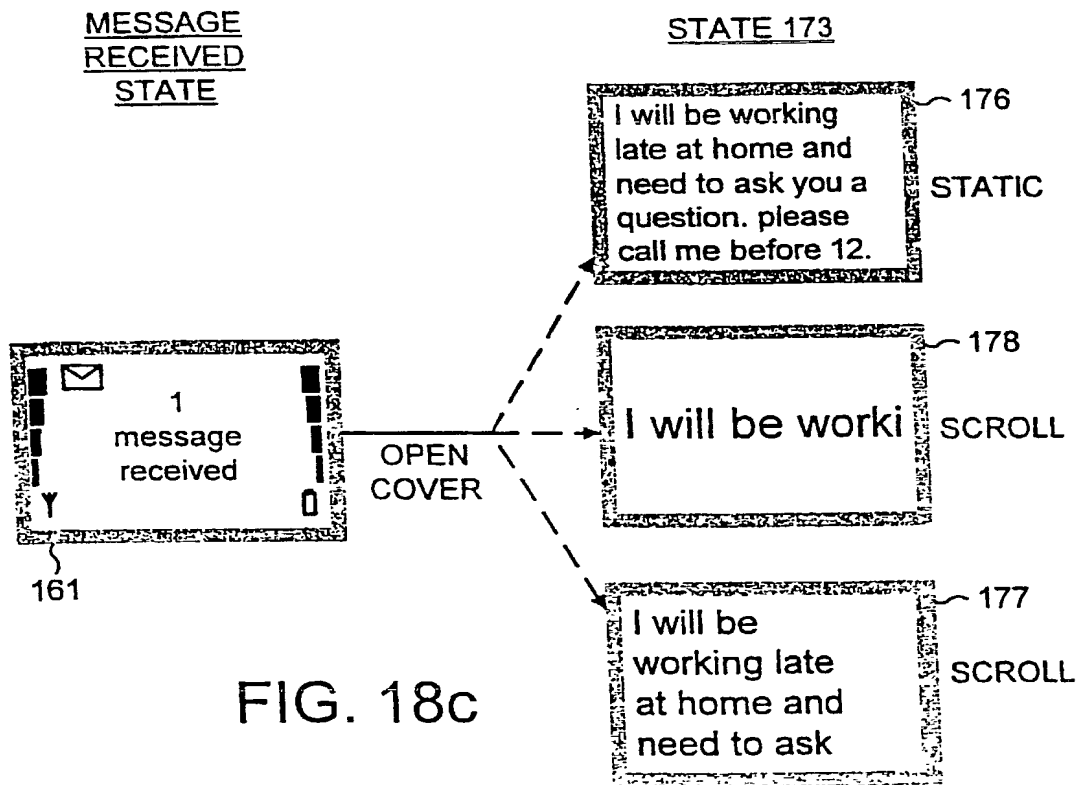


FIG. 18c

I, the below named inventor, hereby declare that my residence is

the specification of which

$$\overline{X}$$

I hereby claim foreign priority benefits, under 35 U.S.C. 119(a)-(d) or 365(b), of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed:

Priority Claimed?

9923925.3

GB

8 October 1999

X

(Number)

(Country)

(Foreign Filing Date)

Yes      No

(Number)

(Country)

(Foreign Filing Date)

Yes      No

below:

(Application Number)

Filing Date

(Application Number)

Filing Date

I hereby claim the benefit, under 35 U.S.C. 120, of any United States application(s) listed below:

(Application Number)

Filing Date

(Status -- patented, pending, abandoned)

(Application Number)

Filing Date

(Status -- patented, pending, abandoned)

I hereby appoint: Donald R. Antonelli, Reg. No. 20,296; Melvin Kraus, Reg. No. 22,466; William I. Solomon, Reg. No. 28,565; Gregory E. Montone, Reg. No. 28,141; Ronald J. Shore, Reg. No. 28,577; Donald E. Stout, Reg. No. 26,422; Alan E. Schiavelli, Reg. No. 32,087; James N. Dresser, Reg. No. 22,973; Carl I. Brundidge, Reg. No. 29,621; Paul J. Skwierawski, Reg. No. 32,173; and Robert M. Bauer, Reg. No. 34,487; of ANTONELLI, TERRY, STOUT & KRAUS, LLP with offices located at 1300 North Seventeenth Street, Suite 1800, Arlington, Virginia 22209, my attorneys, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Title 37, Code of Federal Regulations, Section 1.56  
Duty to Disclose Information Material to Patentability

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by 991.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) Prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) The closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application;

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

(e) In any continuation-in-part application, the duty under this section includes the duty to disclose to the Office all information known to the person to be material to patentability, as defined in paragraph (b) of this section, which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.